

## USE OF INFORMATION COMMUNICATION TECHNOLOGY (ICT) IN MONITORING

### Main Messages

1. Information Communication Technology (ICT) provides a set of tools for improving the quality and timeliness of sanitation interventions, through improved data for decision-making in both rural and urban environments. With the reduction in costs of ICT tools, it is much easier now than ever before for governments to integrate ICTs into their Monitoring and Evaluation frameworks. ICTs were pioneered for monitoring water and sanitation programmes - such as FLOW (Field Level Operations Watch) and Water Point Mapper – and have been particularly effective in establishing inventories of assets. ICTs have been used to mark the location of infrastructure, log how many people use the services and whether services are deteriorating or broken-down. Through ICTs it may be possible to monitor in relatively less time, representing a cost and time saving.
2. There are now experiments with similar systems for urban and rural sanitation such as the Sanitation Mapper and CLTS Mapper from Angola. The intention with ICTs in sanitation generate timely, accurate information about sanitation indicators and monitor the progress (or lack of progress) from open defecation to improved sanitation. Timely, accurate information can provide an opportunity to learn from successful initiatives and/or identify and correct challenges.
3. There are many opportunities and challenges to integrate ICT solutions into existing monitoring and evaluating systems at different levels of government. A key challenge will be to make the transition from one-off exercises to routine updating of the information and institutionalisation of monitoring systems. It is also recognised that organisations lack incentives and resources for integrating ICT into their work-flow, particularly in remote, rural communities.
4. Information collected through such systems can be used to accurately and clearly assess the situation from the field for decision-making, planning and budget allocation. Policy-makers and government officials can assess and choose the most appropriate system for their country context.
5. Remember that more data doesn't necessarily mean better information or improved performance. Along with improved monitoring, there is the need for corrective action in response to both successes and poor performance. Ultimately it should be borne in mind that technology is only 10% of the solution to improved monitoring and evaluation, the other 90% is everything else you need to do (training, community engagement, etc.) to make the programme possible. Technology should not be considered as the end in itself but a means to an end.

### Introduction

ICT is a combination of technology and programming to communicate information through digital systems; for example, mobile phones and computers could be used to collect data on community level realities of health and development programmes. With the rapid spread of mobile phones and network coverage, cheaper Global Positioning Systems (GPS) and smart phones that include GPS functions, the mapping, or visualisation of coverage of sanitation is set to increase in popularity.

## Experiences

Several attempts have been made to monitor distribution and access to sanitation facilities and an increasing number of governments and organisations are using technologies for more sophisticated monitoring of CLTS, including the option of using simple and easy to interpret maps, charts, graphs, etc. to visually articulate trends in ODF status. A number of important examples using ICTs for monitoring and mapping sanitation facilities were presented in the workshop, such as:

- The CLTS Mapper is a simple monitoring tool that links GPS data, Microsoft Excel and Google Earth to generate village level maps displaying indicators including latrine coverage, open defecation free status and water contamination;
- The Sanitation Mapper (SHARE/WaterAid) is a simple monitoring tool that links GPS data, Microsoft Excel and Google Earth to generate maps displaying indicators including latrine coverage, open defecation free status to generate slum or village level maps;
- Google Fusion tables and Google Earth for hosting CLTS data online (Government of Madhya Pradesh and UNICEF);
- Android phones for sanitation data collection in New Delhi and SMS and web-based sanitation monitoring systems in East Java (WSP);
- Spatial Collective has experience with youth and community led digital mapping using Open Source Software options for gathering, analysing and sharing geographic and other information about sanitation and development indicators, both qualitative and quantitative;
- Government of India has been using online monitoring and a web based platform.

Many systems currently use a GPS tracking device to generate location coordinates of a sanitation facility which are then analysed through an Excel based model and results presented as a colour coded map. There are different innovations in different countries. An innovation does not need to be perfect but needs to fit the context of the country; for example, in India, smart-phones may work for data collection, but in may not be suitable in Angola. These ICTs can be valuable tools to inform the planning and design of interventions and build evidence for effective advocacy and programme planning in the sector. For instance, near real-time tracking of progress can allow improved programming and course correction. Whilst it was acknowledged that ICT solutions can lead to: cost saving, time saving and improved information quality, it was that proposed that the technology is only 10% of the solution to improved monitoring and evaluation, the other 90% is everything else you need to do (training, community engagement, etc) to make the programme possible. Technology should not be considered as the end in itself but a means to an end. ICTs aim to provide a user-friendly service aimed at WASH practitioners and local government staff working at district, sub-district and village levels, which allows monitoring sector performance. It is important to collect user feedback to ensure user uptake and positive user experience.

The following case studies and experiences outline how these systems work in more detail.

# The CLTS Mapper: Experiences from Angola

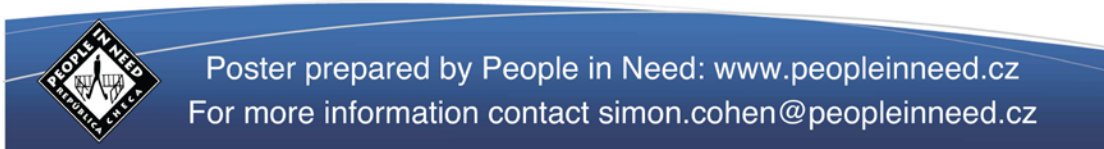
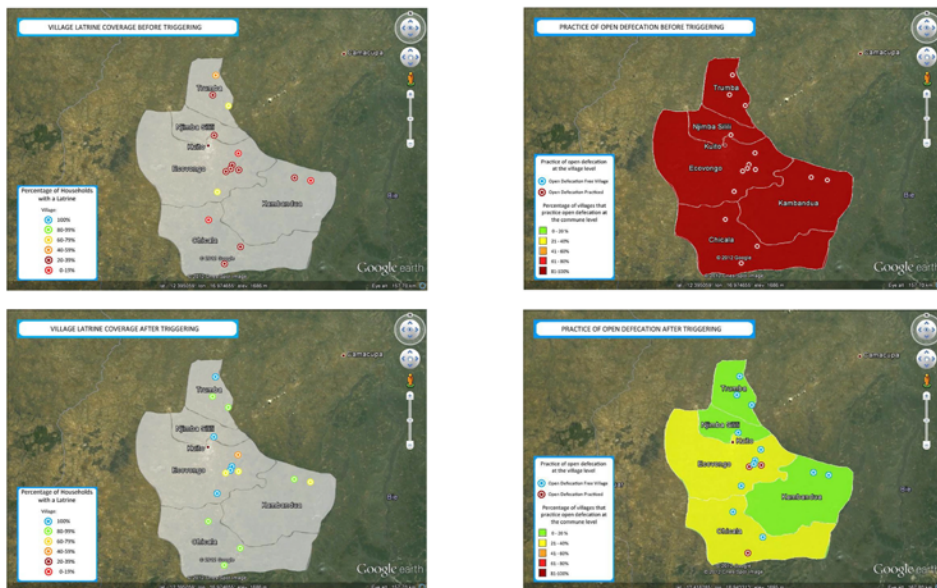


## People in Need's 'CLTS Mapper'

The context for this workshop described some of the challenges of going to scale, including "inflated reporting, myths of ODF being achieved and the failure to be in touch and learn about field realities". This 'well trodden' path is all too tempting to follow, especially for organisations running large programmes, due to the complexity of collecting and analysing data and the lack of monitoring software. Determined not to take this route, People in Need, who are running CLTS programmes in over 160 villages in Angola, developed the 'CLTS Mapper'.

The 'CLTS Mapper' is an adaptation of WaterAid's Water Point Mapper, which was designed to monitor water point coverage, functionality and water quality. People in Need have developed this software to measure village latrine coverage, latrine coverage for single female headed households, the practice of open defecation and the presence of faecal chloroforms in the villages main source of drinking water both before triggering and after monitoring. The system links GPS coordinates, Microsoft excel and Google earth to generate maps that clearly show the reality on the ground. Below, on the left, are example maps of village latrine coverage before triggering and after monitoring. The dots represent a village and the colour represents the percentage latrine coverage. Below, on the right, are example maps of the practice of open defecation before triggering and after monitoring. In addition to monitoring at the village level, these maps provide information at the district level, represented by the shading.

The 'CLTS Mapper addresses the challenges set by this workshop. It allows rapid realism for implementers and policy makers as accurate and high quality data can to be produced and shared quickly and easily. The simplicity of the system means that communities can collect the data, local level staff with little computer knowledge can enter into Microsoft excel and then share with people higher up the system. Overall, the 'CLTS Mapper' can help "Governments to be realistic, in touch and up-to-date and continuously learn, adapt and do better".



## The Sanitation Mapper

The Water Point Mapper (WPM), conceptualised and developed by WaterAid, has proven to be a valuable tool to inform the planning and design of interventions and build evidence for effective advocacy in the sector (Welle, 2005). The WPM allows the display of non-functional/semi-functional water sources, the distribution of improved water supply services to highlight inequalities, as well as providing information on water quality by mapping high risk contaminants in the water source.

Yet, mapping the access and type of sanitation facilities lags behind the progress made in the water sector. Several attempts have been made to monitor distribution and access to sanitation facilities.

Typically, monitoring and mapping sanitation facilities focuses on informal settlements where a lack of information regarding boundary delineation and existing infrastructure restrict efforts to improve water and sanitation infrastructure and services (Hasan, 2006). They are based on manual data collection and GIS technologies, with others adopting more complex mapping software such as in the Kilifi Mapping Project. Despite their successful application in sanitation projects, these technologies present some limitations in terms of cost and management, user friendliness and thus new tools for mapping and monitoring data are to be explored. Acknowledging the knowledge gap in this area, this field note reports on the piloting of Sanitation Mapper, monitoring tool developed by WaterAid and piloted in two areas of Bangladesh.

Sanitation Mapper is a simple and low cost technology, to map sanitation facilities and their status in low and middle-income countries. The process is based on Water Point Mapper experiences from WaterAid country programmes in Southern and East Africa regions. Sanitation Mapper uses a small number of core parameters to produce maps. The Sanitation Mapper has point and shape data handling capability so trends can be aggregated and presented at local-authority administrative level. The tool is designed to work using Windows, running Microsoft Excel and uses the Google Earth application to visualise data. Once Google Earth has been installed, it can be run offline and maps can be generated without internet connection. Detailed base maps can be cached in Google Earth when an internet connection is present and can be used offline. Figure 1, below, illustrates the process at the basis of the Sanitation Mapper.

The Sanitation Mapper has been tested and piloted in monitoring and mapping informal settlements in Dhaka and Matlab (Chandpur) in Bangladesh collecting information on sanitation facilities in urban and rural areas. The tool has been developed to analyse information collected at both community and latrine level. In testing the Sanitation Mapper we collected village level information from rural Matlab through sampled household surveys, and latrine level information within a ward in Dhaka. The data collection exercise lasted six days for several small teams collecting a range of relevant indicators including:

- Number and gender of latrine users
- Latitude and longitude
- Type of facility (latrine, floor, roof, superstructure)
- Hygiene aspects (drainage, hand-washing, presence of soap)
- Water supply (storage, bathing)

- Management (waste management, finance and payment)
- Security (Lighting, locking and distance from household)

The Sanitation Mapper tool can also collect information which focuses on equity of the sanitation service provided. These relate to the presence of disabled and child-friendly adaptations and the presence of menstrual hygiene management facilities.

The Mapper aims to provide a user-friendly service aimed at WASH practitioners and local government staff working at district, sub-district and village levels, which allows monitoring sector performance. Further studies are planned to evaluate the efficacy of the Sanitation Mapper as tool for mapping, monitoring and planning together with identifying a mechanism allowing for institutionalisation of mapping tools in local and national governments' decision making process.

You can download the Sanitation Mapper for free from the SHARE website: [www.sharereseach.org](http://www.sharereseach.org) and [www.waterpointmapper.org](http://www.waterpointmapper.org)

If you are interested in this research or have any questions or comments about the project, please get in touch: [contactshare@lshtm.ac.uk](mailto:contactshare@lshtm.ac.uk)

Figure 1: The Sanitation Mapper



# The Sanitation Mapper

**Coming soon!**  
When finalised, the tool will be freely available from: [www.sharesearch.org](http://www.sharesearch.org) and [www.waterpointmapper.org](http://www.waterpointmapper.org)

Sanitation Mapper is a free and simple monitoring tool designed to generate maps for use in planning improved sanitation interventions.



**Objectives:**

- To monitor the distribution and status of sanitation facilities
- Evidence based decisions and planning
- Improve targeting of marginalised communities (equity).

**Key features of the Mapper:**

- Very simple to use.
- Produces maps showing the coverage of improved sanitation and hygiene practices.
- Aimed at WASH practitioners as well as local governments working at the district and sub-district levels.
- Replaces the need for expensive GIS licenses.
- Designed for use in situations where there is no internet connectivity.

## The Sanitation Mapping Process



**Sanitation Mapper**  
A free, simple and powerful mapping tool.

**Latrine user numbers**

**Sanitation facility usage**

| Facility      | Usage                |
|---------------|----------------------|
| Blue circle   | < 10 users per seat  |
| Yellow circle | 10-75 users per seat |
| Red circle    | > 75 users per seat  |

**Area**

|          |                                      |
|----------|--------------------------------------|
| Green    | 00-10000 Facilities > 100 users/seat |
| Yellow   | 40-10000 Facilities > 100 users/seat |
| Orange   | 40-10000 Facilities > 100 users/seat |
| Red      | 10-10000 Facilities > 100 users/seat |
| Dark Red | 0-10000 Facilities > 100 users/seat  |

**Infrastructural level Number of people served by latrine seat**  
Number of people served by Latrine seat is nearly 17

| Water source observations  |            |
|----------------------------|------------|
| Project ID                 | 1476463    |
| Latrine ID                 | Individual |
| Level                      | Communal   |
| Longitude (decimal degree) | 10.24038   |
| Latitude (decimal degree)  | 23.88076   |
| Name of city/town          | Shaha      |
| Population of city/town    | 700000     |
| Ward                       | 15         |

**How the Sanitation Mapper works:**

- Data is collected from each latrine using a data collection form and a GPS unit
- Information is extracted from each of the data collection sheets and entered into the Mapper spreadsheet
- A range of different mapping options can be selected from the spreadsheet
- Maps generated by the Spreadsheet Mapper can be viewed in Google Earth



Sanitation Mapper has been designed to provide both area-based mapping (e.g. village level coverage) and point-based mapping (e.g. for instance community latrines in slums).

**Acknowledgments**

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**Team Members:** Joseph Pearce and Sue Cavill (WaterAid)  
**Partners:** Sirajul Islam (ICDDR,B) and Tim Ndezi, (CCI)  
**Advisors:** Erik Harvey (WaterAid) & Chris Brown (Consultant)

## **Concurrent M&E system to track CLTS progress using Google Fusion and Google Earth - Budni Block, Madhya Pradesh, India (from a UNICEF Note, August 2012)**

The CLTS programme in Budni Block, Madhya Pradesh, India, supported by UNICEF, aims to obtain the first-of-its-kind model resource ODF Block in Madhya Pradesh, through CLTS. The programme uses a combination of innovative M&E applications to track progress and manage follow up: Google Earth and Google Fusion offer powerful tools for fine-tuning implementation, triggering and follow-up strategies to accelerate progress towards ODF.

### **GOOGLE FUSION AND GOOGLE EARTH**

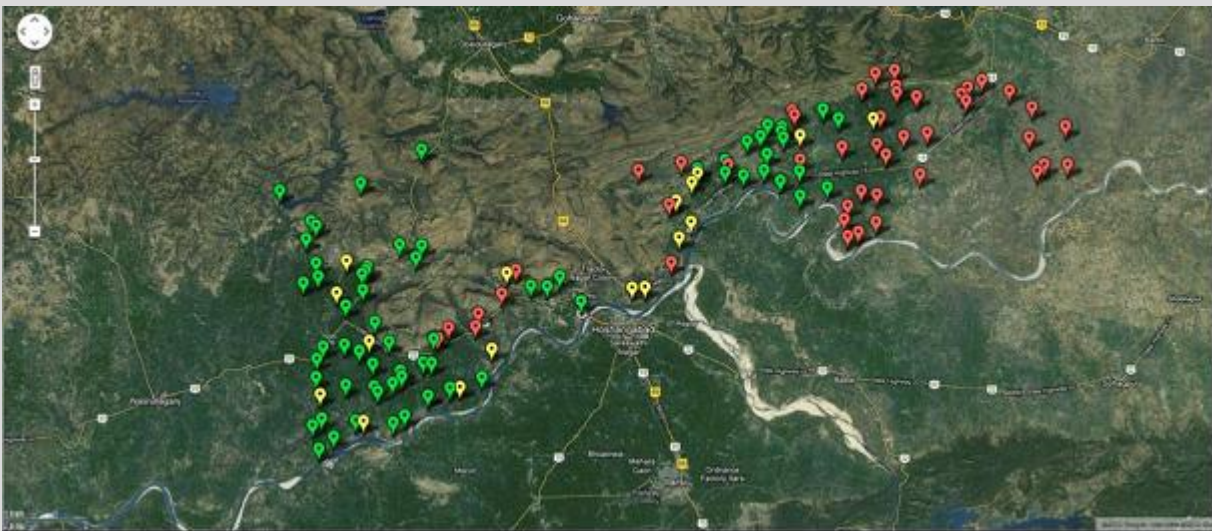
Fusion Tables is a Web service provided by Google for data management. In Fusion, data can be uploaded, updated and stored in multiple tables with different applications that Internet users can view and download. Fusion Tables are user friendly and have similar applications than Microsoft Excel.

Their additional advantage, however, is that they can be directly linked to Google Earth's GIS system, and can thus be potentially used as powerful concurrent Monitoring and Evaluation (M&E) applications.

### **M&E APPLICATIONS**

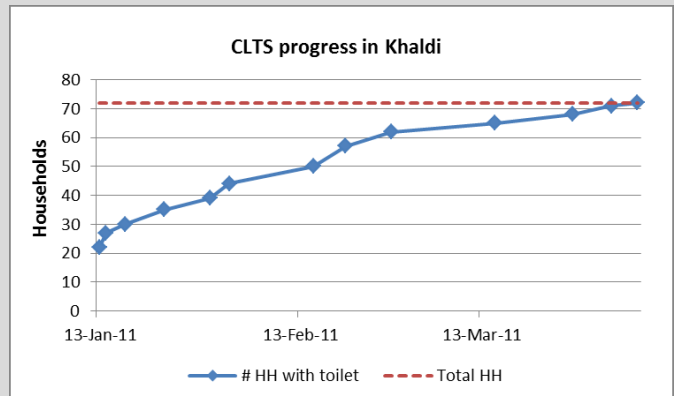
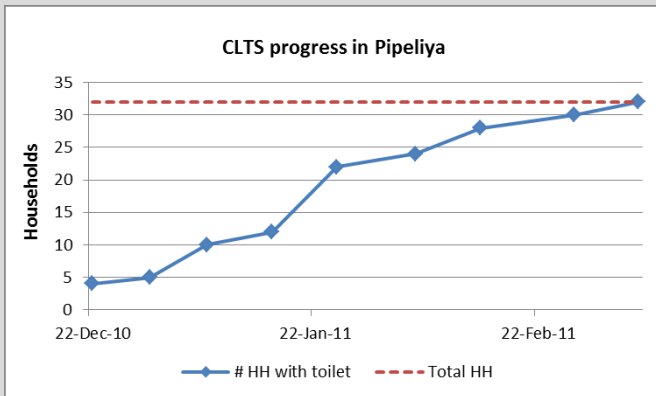
Here are some of their M&E applications currently used to track the progress of the CLTS programme in Budni:

- **Host data online** in a common single platform, accessible by different users in different locations. Viewers located anywhere can review charts, tables and maps.
- **Create custom visualizations** for the stored/updated data. For instance, in the screen shots given from Budni's CLTS programme below, three color coding are currently used to visualize the progress of a given village: green (ODF village), yellow (triggered, not ODF yet), red (not triggered).



*Screen shot of Budni's CLTS Google Earth visualization*

- **Produce “CLTS Report Cards”**: these report cards provide tailored information about the village’s CLTS progress. These cards can be generated from the Fusion Tables for all villages. The cards contain information such as the CLTS progress of that particular village, the triggering date, number of conducted follow-ups, ODF date, CLTS focal point in the village and their phone number, status of school and Anganwadi toilets, handwashing facility, as well as the option to include some pictures.
- **Generate charts and graphs**: Fusion tables also help to create and share charts in various formats. For instance, timeline progress charts can be easily produced and then displayed separately or as part of the Report Cards on the Google Earth interface. Below are two simple examples of CLTS progress in two villages, along the timeline from the triggering date, until ODF date, with each marker representing one follow-up event.



To see the full report, please visit the CLTS website at:  
<http://www.communityledtotalsanitation.org/resource/concurrent-me-system-track-clts-progress-using-google-fusion-and-google-earth>

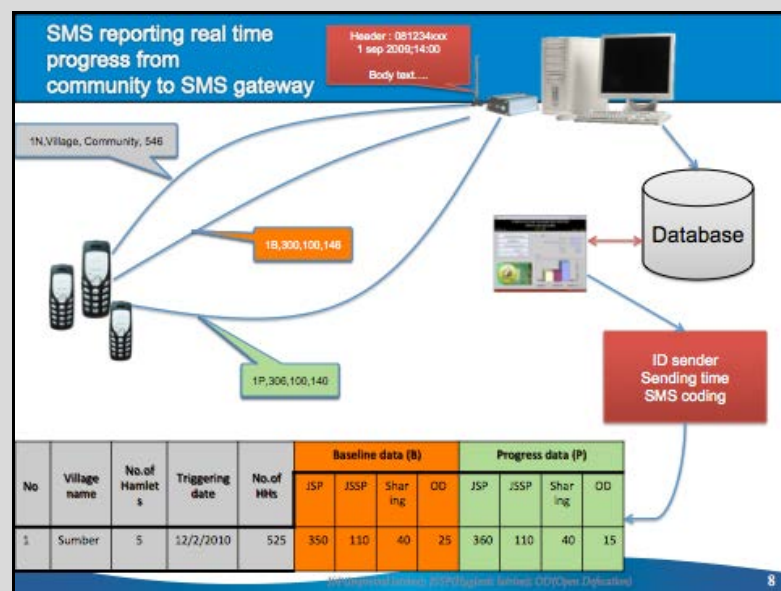


## Utilise short message service (SMS) for reporting progress from the field

### Background:

TSSM, the new rural sanitation intervention has been introduced in Indonesia since 2007, and through the assistance of the Bill and Melinda Gates Foundation, the intervention has been modified with a two pronged approach of total sanitation and sanitation marketing. It was implemented in 29 districts of East Java province and a demand responsive approach was adopted at all levels of intervention.

Regular outcome monitoring is difficult at scale. The public health institutional structure in East Java allocates responsibility for sanitation monitoring to the sanitarian. If all of the sanitarian<sup>1</sup> positions were filled, then each sanitarian would have to monitor sanitation outcomes in about 29 hamlets containing around 2,500 households. Collecting monitoring data from this many communities and households every month presents significant challenges, as does the processing and utilization of the data by district, provincial and central monitoring staff. The TSSM project encountered these practical monitoring problems as the number of project communities rose into the thousands, it was observed that even though monitoring data was being generated regularly in the communities, much of this data was not reaching sub-district, district, or higher levels for regular consolidation. To overcome bottlenecks, a data collection process using mobile phones, short message service (SMS), and a computer-based gateway system was piloted in two districts where the project is being implemented. Starting from a pilot in Jombang district in December 2009, it has now been introduced to 109 districts/cities in 4 provinces. Field visits and observation-based ODF verification by local government teams are used to crosscheck phone-reported data.



<sup>1</sup> All districts have health center outreach staff called *sanitarians*, functioning at sub-district and community levels for improving environmental health.

## Web and SMS based monitoring system:

In addition to features that are accessible to the public, this system is also a part of the STBM<sup>2</sup> monitoring system. Therefore, the various modules require separate procedures to operate them in compliance with operating standards in the system that has been developed. There are two sub-systems: web-based and SMS-based. These two sub-systems have only one database, so the system needs to synchronise the two. The bond point of the two systems is a unique code that is based on a registered sanitarian hp number and village code provided by Central Agency on Statistics (BPS).

development in progress

MONITORING DATA

Laporan Kemajuan (LB-1)

| No      | Nama Kabupaten | Identitas Data<br>(Jumlah data/keseluruhan*) |                 |                     | Baseline |         |         |         | Kemajuan |        |         |         |
|---------|----------------|--|-----------------|---------------------|----------|---------|---------|---------|----------|--------|---------|---------|
|         |                | Jumlah Kec                                   | Jumlah Desa/Kel | Jumlah KK           | JSP      | JSSP    | Sharing | BABS    | JSP      | JSSP   | Sharing | BABS    |
| 1       | BIMA           | 18/18  | 181/177         | 114.949/120.489     | 42.844   | 11.296  | 16.400  | 44.439  | 33.708   | 0.684  | 11.182  | 30.319  |
| 2       | KOTA BIMA      | 5/5  | 38/38           | 33.307/34.707       | 19.480   | 322     | 6.763   | 6.744   | 1.929    | 13     | 183     | 103     |
| 3       | DOMPLU         | 8/8  | 79/79           | 55.837/60.776       | 17.020   | 8.830   | 8.274   | 21.713  | 425      | 302    | 569     | 481     |
| 4       | LOMBOK BARAT   | 10/10  | 116/123         | 178.519/185.450     | 62.316   | 15.410  | 19.883  | 74.725  | 59.935   | 16.655 | 20.880  | 72.078  |
| 5       | LOMBOK TENGAH  | 12/12  | 130/139         | 280.839/296.433     | 84.903   | 38.059  | 13.380  | 153.591 | 8.153    | 3.329  | 1.855   | 8.274   |
| 6       | LOMBOK TIMUR   | 20/20  | 215/215         | 387.153/364.912     | 83.359   | 41.599  | 2.411   | 259.784 | 87.612   | 24.975 | 8.971   | 97.975  |
| 7       | LOMBOK LITARA  | 5/5  | 33/33           | 61.838/62.275       | 25.019   | 5.433   | 7.210   | 24.178  | 25.066   | 5.486  | 7.257   | 24.029  |
| 8       | KOTA MATARAM   | 6/6  | 50/50           | 80.681/99.376       | 66.543   | 5.041   | 2.282   | 6.815   | 6.633    | 430    | 255     | 728     |
| 9       | SUMBAWA        | 22/24  | 154/166         | 105.472/113.817     | 52.840   | 848     | 1.035   | 50.758  | 37.246   | 3.201  | 7.841   | 22.970  |
| 10      | SUMBAWA BARAT  | 8/8  | 63/64           | 32.434/32.948       | 22.190   | 8.935   | 6       | 0       | 0        | 0      | 0       | 0       |
| Total : |                | 114/116                                      | 1.059/1.084     | 1.341.029/1.371.183 | 476.523  | 136.643 | 77.544  | 642.745 | 260.705  | 64.075 | 58.953  | 256.935 |

Keterangan :  
 JSP = Akses Jamban Sehat Permanen  
 JSSP = Akses Jamban Sehat Semi Permanen  
 Sharing = Masih Numpang ke Jamban Sehat  
 BABS = Masih Buang Air Besar Sembarangan

This system works in real time when sanitarians/ sub-district environmental health officers are conducting monitoring activities in the STBM target villages. The officer sends the monitoring data via SMS transmission. This data is then processed by the SMS gateway server which sends an auto response SMS to the data sender after verifying the data. Data that has been verified by the SMS gateway is uploaded to the webserver.

Monitoring personnel at the district health office can monitor these data updates directly via the STBM website through their user accounts.

### Features of M&E application:

Public visitors to the STBM website (<http://website.informer.com/visit?domain=stbm-indonesia.org>) can see and access the following type of data:

- Village sanitation access data, differentiated by improved latrine, hygienic latrine, sharing, and open defecation.
- ODF community data.
- District benchmarking data; this feature will show the district's performance in terms of implementing CBTS. Several indicators are used that are closely related to the three components of CBTS, seen in terms of input, process, output, and outcome.

<sup>2</sup> STBM is the Indonesian name for a Community Based Total Sanitation program

- Implementing actors of STBM; this feature is to show the actors that are implementing CBTS across Indonesia, including governments, NGOs, donors, media, etc. This information will also appear in the form of a map.

Districts using their user account could access all of the data including the detailed ones.

For further information, see Mukherjee et al (2011) *Managing the Flow of Monitoring Information to Improve Rural Sanitation in East Java*, Water and Sanitation Program,

[www.wsp.org/wsp/sites/wsp.org/files/publications/WSP-Monitoring-Information-TSSM.pdf](http://www.wsp.org/wsp/sites/wsp.org/files/publications/WSP-Monitoring-Information-TSSM.pdf)

## **Youth and community mapping of sanitation in Mathare slums, Nairobi, Kenya**

The Urban Community Led Total Sanitation (UCLTS) programme in Mathare informal settlement in Nairobi, Kenya is a collaboration between Community Cleaning Services (CCS), Plan Kenya and the City Council of Nairobi. The initiative began in mid-2010 with the aim of improving sanitation in several villages in Mathare. To support the work, CCS and Plan Kenya invited Map Kibera Trust, an organisation that works with young people to create maps and other digital information about their communities, to support a group of community members in Mathare to document the sanitation situation.

The digital tools used for this community-based M&E initiative included: OpenStreetMap, WordPress and YouTube.

Over several months, the youth and community members created a comprehensive base map covering roads, paths, public services, water points, sanitation facilities, open defecation areas, garbage dumps, open drainage, among other points of interests. The maps and stories were then used by CCS and Plan Kenya within an advocacy strategy to encourage the City Council of Nairobi to carry forward and expand the UCLTS work across Nairobi; this expansion successfully began in May 2012.



*Sharing geographic information in an open community forum in Mathare*

### **OpenStreetMap, WordPress and YouTube**

OpenStreetMap is a citizen-generated database of geographic information from around the world. People are able to create a free account and contribute data about their communities. This data is then freely available for anyone around the world, thus providing the potential for citizens, organisations and governments to use the information for improved planning and coordination.

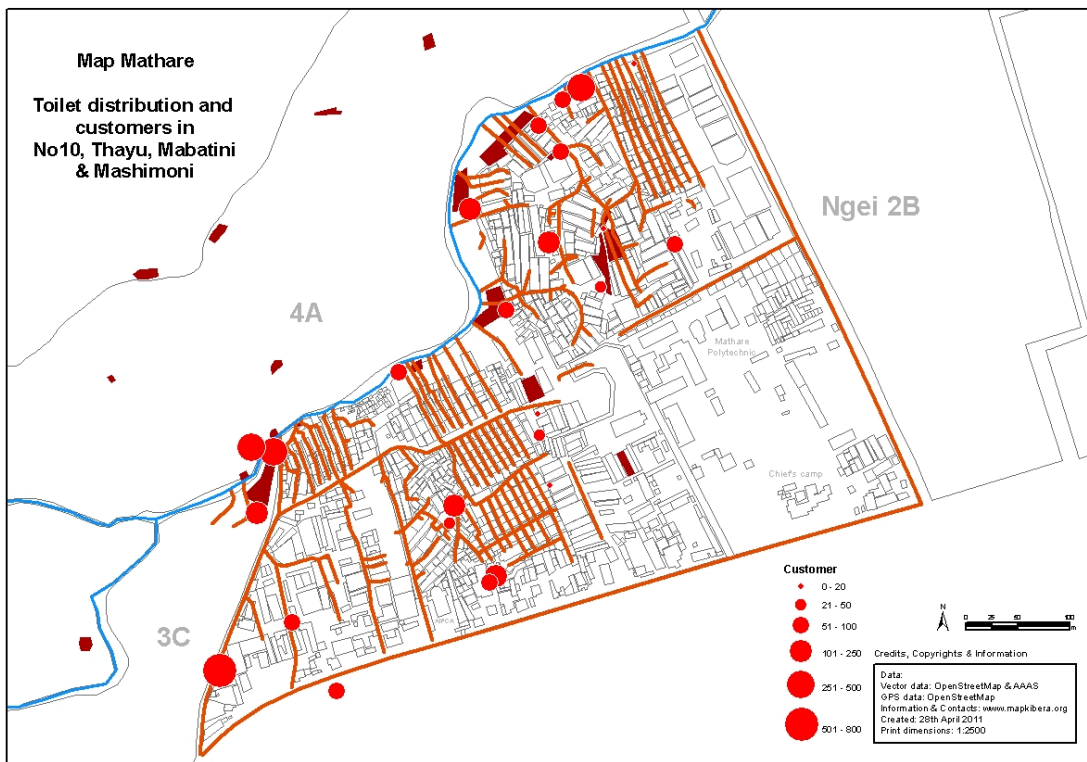
The team also used WordPress, an online blogging (or online journal) platform that allows people to

create and share stories and videos about sanitation and other related issues. YouTube, an online platform for sharing videos, was also utilised and young people created videos about their sanitation experiences in Mathare slum.

## M&E APPLICATIONS

Open Data and Social media can empower citizens to create data about their communities. Here are some examples of how citizens, organisations and government can use this data to Monitor and Evaluate CLTS:

- **Share data online** in open data format through an online database which can be viewed, downloaded and re-used by people around the world.
- **Create printable maps** to display and communicate the data both on and offline. These can be used to by **citizens, organisations and governments to monitor the sanitation situation** to document progress (or challenges to progress) and change over time.
- **Generate stories about sanitation experiences** using social media, to “tell the story” behind the maps. Videos can be used to give context to the data and can be shared both on and offline. Blogs are also free tools to share information and reach a local, national and international audience.



**Map of toilets displayed by number of customers reported to use the toilet per day, along with Open Defecation areas and open drainage lines in four villages in Mathare. This area is home to approximately 15,000 people and has only 25 public toilets with 95 seats.**

**Keep in Mind:**

Open Data and social media hold great potential to empower communities to monitor progress toward sanitation, but alone they are only 10 per cent of the equation. The other 90 per cent involves raising awareness about the importance of the issue and the significance of the data (what does it mean that there are only 95 toilets per 15,000 people? What can we do about this? What do we want the local government to do about this?), mobilising resources and support and planning to create and sustain change in sanitation behaviours and the environment.

Do encourage citizens to get involved! Youth and community groups can be supportive, powerful partners for local governments. They can act as third party verifiers and generate data that can spur debate and encourage reform; however, you need to think about incentives for participation – why do community and youth groups get involved? New technologies can be a great attraction, particularly for youth groups, but beyond the ‘technovelty’ of the M&E initiatives and learning new skills, M&E is a marketable skill – how can youth and community groups and small businesses become partners with local government?

Allocate sufficient time for planning. Planning is the key to any successful ICT-enabled initiative. Consider the information management strategy and how it fits in with existing work-flows. Consider how the tools and gadgets (hardware and software) will be managed.

Think about your audience. In this case, City Council of Nairobi was a clear audience for advocacy efforts. The data were collected by community residents and allowed for them to explore their community in a new way, but they also had a larger purpose: to generate evidence about the sanitation situation in Mathare and communicate the need for scaling up UCLTS throughout Nairobi.

To read more, please visit the CLTS blog at: [www.communityledtotalsanitation.org/topics/gis](http://www.communityledtotalsanitation.org/topics/gis) and the Mathare Valley blog <http://matharevalley.wordpress.com>

## Using Mobile Phones to Strengthen Monitoring of Rural Sanitation Outcomes

*'India has more cell phones than toilets'*

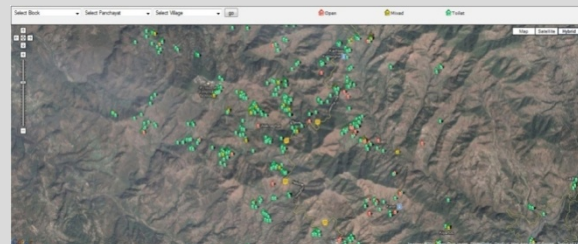
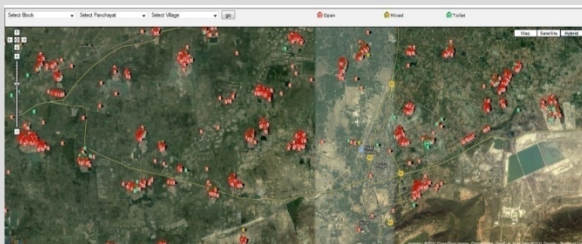
### Need for Mobile Monitoring

- Existing monitoring system for rural sanitation in India provides information on toilet construction progress on a monthly basis, whereas NGP tracks achievement of ODF communities on an annual basis. Usage of toilets at household level is tracked through sample surveys which make results available in 3-4 years. A mechanism is needed between routine, NGP and survey monitoring to provide timely and quality information on *usage* of toilets.
- Monitoring toilet usage or behaviour, compared with monitoring toilet construction, requires frequent cross-checks at short intervals and is costly, in terms of time, effort and money.
- Mobile phones have proliferated in recent years and are increasingly being used to facilitate improvement in service delivery in many social sectors. Hence, a proof of concept was designed to test the viability of using mobiles to monitor toilet usage.

### Proof-of Concept – Using Mobile-to-Web Monitoring System

This was undertaken in two blocks of Bihar and Himachal Pradesh. Information was collected from a sample of 23,000 rural households in the space of 3 months.

- An Android app – *Outcome Tracker* – has been developed to collect information on sanitation coverage and behaviour. It contains 6 key questions:
  - Economic status of the household (APL/BPL);
  - Whether the household has access to a toilet;
  - Sanitation behaviour of each member of a household, starting with the eldest usual resident, and type of toilet used or whether practicing open defecation;
  - In case the household includes a child under three years, method of disposal of child faeces;
  - Material available for hand-washing
  - Photograph of respondent, generates GPS coordinates of interview location
- Information collected through the app sent to a centralised, online MIS system designed to handle large dataset, available for view within minutes of an interview being completed. MIS system uses in-built quality to check to flag up potential errors.
- User can view data as individual report or aggregate results. GPS was combined with Google Earth software to create a colour-coded map of the households. In the maps below, red dots indicate households where open defecation is practiced, yellow indicates households where some members practice open defecation, and green indicates all members use a toilet.



## Results

Proof-of-concept demonstrated that:

- Using smartphones can provide quick, credible information
- Features such geo-tagging and photograph facilitate quality assurance
- Results available online in near real time, within minutes of an interview being completed
- Results can be presented in user-friendly format

## Applications of Concept

This approach of using mobile-to-web system to monitor behaviour in rural sanitation programs can be streamlined with the existing online monitoring system as follows:

- Existing online monitoring system which tracks inputs and outputs, can be strengthened with outcome tracking i.e. sustainability of toilet usage. This can be done at periodic intervals, which contributes to the decision making process at various levels. This can be undertaken using in-house resources of the Govt. or through third party contracts. Results can be made available online e.g. through the MDWS website ([www.ddws.org](http://www.ddws.org)) or [www.nirmalbharat.org](http://www.nirmalbharat.org)
- Assessment of applicants for NGP prize could use this approach to enhance the quality of the data collection process. Can also be used for assessment of sustainability of toilet usage in previous years NGP winners.
- Apart from surveys of sanitation, mobiles have also been used for water-point mapping, for example, through FLOW or Field Level Operations Watch. Mobiles can potentially be used for Information, Education Communication to spread awareness about safe sanitation through SMS, robocall etc

## More Information

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<http://www.wsp.org/sites/wsp.org/files/publications/WSP-Manage-What-You-Measure-Using-Mobile-Phones-Strengthen-Outcome-Monitoring-Rural-Sanitation.pdf>



## Challenges in the use of ICT in monitoring and evaluation

ICT was once seen as ‘the new kid on the block’; although policy-makers are flooded with ideas around ICT there are still many barriers to the use of ICTs – not least the low network coverage in many rural areas. In some countries, the levels of hardware and software skills required, the fact that technologies can quickly become redundant, and the degree of backstopping often necessary present further barriers to uptake. And whilst ICT can be used to make information available to many stakeholders, including the public, there are also examples of barriers to information sharing and there are cases where data are not collected, or collected but not used (data hugging). In some instances, there is a lack of capacity, awareness, motivation and availability of ICT or resources. Some actors may be reluctant to invest in ICT because of a fear of becoming redundant and/or fear of change.

## Knowledge Gaps

- Countries may need to generate specific evidence to assess the cost effectiveness of different data collection methods (i.e. paper based or ICT enabled).
- There are limited examples of experiences in going from pilot experience to scale within a government system; there is thus a need to document and generate evidence in this area.

## Recommendations/Ideas

- Government should lead the process and embed an ICT-enabled monitoring system into existing information flows.
- **Keep it simple!** It’s easy to get caught up in the excitement of innovation, without addressing the information that needs to be identified and considering the users of the system.
- Start with needs and capacity assessment to understand opportunities and limitations, and design a system that fits capacity and meets needs.
- Once the needs assessment is done, consider tools that could have broad applications, beyond sanitation (to maximize benefit and cost savings)
- Any ICT solution should allocate resources for long-term technical support and capacity building
- Capacity building within government institutions should focus both on technical skills but also on information management skills
- The pilot unit has been at village or sub-district level but to move towards taking ICT systems to scale, pilots could be implemented at the district level with full ownership of government
- To address issues of barriers to transparency, performance plans could be process based and this could feed into budget allocation so Ministries of Finance could have better data to be convinced to allocate resources to sanitation (or other health issues as they are realistically reported)
- Consider the role of the private sector and mobile phone operators in particular as important players who could also help in supporting innovations and providing cost-saving options (i.e. in reduced costs of SMS or reduced costs in certain areas as part of Corporate Social Responsibility)
- Consider e-government as a cross-cutting policy to support adoption of ICT solutions in all sectors

- Involve local and traditional leadership in the development of ICT solutions
- Build ICT curriculum into academic institutions across disciplines (planning, public health, environmental conservation, etc) so as to build capacity

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