

Brief No. 4

WATER SECURITY AND MOBILE TECHNOLOGIES

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KEY MESSAGES

Global convergence in mobile network coverage, mobile handset ownership, mobile commerce and smart water technologies provide an informational platform to underpin water security.

A low-cost, scalable and accessible mobile information architecture has led to new and emerging technologies to address challenges in water resource management and water services delivery.

Accurate, timely and reliable data can drive accountability and transparency in the global water sector to improve operational and financial performance.

With two thirds of the 5.3 billion mobile subscriptions in developing regions, initiatives can reach the most in need and most difficult to reach.

While it is premature to determine the scale and sustainability of impacts of mobile innovations for water security, the architecture for transformative change is compelling.



Fig 1. Global distribution by bubble size of smart water metering deployments

1 INFORMATION UNDERPINS WATER SECURITY

Water security increases where reliable, accurate and timely information flows to support financial, institutional and operational performance. Sustainably managing river basins or water supply infrastructure depends upon the supply of hydrological, technical, financial and institutional data. Where data are missing, incomplete or unreliable, water systems and water users will face uncertain and unevenly distributed costs associated with unsustainable resource abstraction regimes, insufficient cost recovery, inappropriate planning and investment, and inadequate policy design. Increasing examples of river ‘closures’, groundwater mining and pollution, aquatic ecosystem degradation, and water supply infrastructure decay or complete absence across the world reflect the escalating and multi-billion dollar costs of achieving water security.

2 HARNESSING INFORMATION FROM MOBILE TECHNOLOGIES

Global convergence of increasing mobile network coverage, mobile handset ownership, mobile



Fig 2. Mobile money deployments in sub-Saharan Africa by 2011

commerce and smart technologies offer new pathways to achieve water security based on a low-cost, scalable and accessible information architecture¹. New technologies offer exciting instruments to improve both water resource management and water services delivery. Technology innovation is occurring both incrementally in the domain of existing water meters becoming ‘smart’ and also transformationally with innovative applications of mobile technology in the water sector. Smart metering consists of measurement, communication and data management components using a meter enhanced with radio frequency or GPRS functionality to transmit consumption data as well as control water flows. Benefits of smart meters included faster and more efficient meter reading, theft

¹ Hope, R.A., Foster, T., Money, A. and Rouse, M. (2012, in press) Harnessing Mobile Communication Innovations for Water Security. Global Policy

WHAT IS MOBILE MONEY?

Mobile money is an electronic payment system that enables money transfers to and from an electronic account that can be accessed via an ordinary mobile phone. Each customer’s account is linked to their mobile phone number by means of an in-built SIM-card application. Physical cash withdrawals and deposits are facilitated by a network of retail agents. While configurations vary across providers, the viability of mobile money is premised upon the cost base associated with an agent network, which is lower and more flexible than establishing ‘bricks and mortar’ bank branches. Mobile money can therefore profitably extend the reach of financial services to those who have traditionally been unbanked, such as low-income or remote households.

and leak detection, greater billing accuracy, enabling a flexible tariff structure, increased read frequency, and the ability to remotely monitor resource use².

People are also instruments of change in using mobile phones either in individually reporting of hydrological events, such as floods or droughts, or through crowd-sourcing approaches using networks of actors to generate and share data quickly and cheaply. Examples of crowd-sourcing include simple text services for water users to report handpump failure or malfunctioning in remote, rural areas. Mobile commerce innovations, such as mobile money where water users pay for water services using their handset, offer time, convenience, security and cost savings to benefit water users, water service providers and mobile network operators³ (Fig.

2). The wider policy implications of these information advances is to drive accountability and transparency in the operational and financial performance of managing resources and delivering services more efficiently and fairly.

3 SMART WATER SYSTEMS

Effective monitoring systems of surface water and groundwater systems at scale are now feasible. Smart water systems can provide the information base for water managers and water regulators to ensure sustainable and fair abstraction of water resources over time and space. Smart metering innovations are well-established

in the water services sector in industrialised countries, and the market is projected to maintain an annual growth rate of between 8% and 14%. Europe and North America account for 89% of the global smart water market in terms of module shipments. Projects vary greatly in size from small rural towns to large cities such as New York and Mumbai. Over the past decade Boston, District of Columbia, Cincinnati, Philadelphia, Atlanta, Chicago and Detroit have implemented major smart metering projects. Recent projects in Mumbai and Dar es Salaam indicate developing countries will figure more prominently in the coming years. Similarly, smart metering companies are beginning to tailor products to emerging market needs, such as Elster's smart standpipe solution. Smart standpipes can accelerate access to piped water in areas not primarily served by household connections via an automated and metered water dispensing unit. Water is released by swiping a fob card that debits the user's private and secure mobile water account. This is part of the development dividend.

2 Hope, R., Foster, T., Money, A., Rouse, M., Money, N. and Thomas, M., 2011. Smart Water Systems. Available at: <http://owfp.ouce.ox.ac.uk/was/smart-water-systems.php>.

3 Hope, R.A., Foster, T., Krolikowski, A. and Cohen, I. (2011) Mobile Water Payment Innovations in Urban Africa. December 2011, School of Geography and the Environment and Skoll Centre for Social Entrepreneurship at Saïd Business School, Oxford University, UK.

Fig 3. Access to improved water services and mobile subscriptions in sub-Saharan Africa, 1990-2008

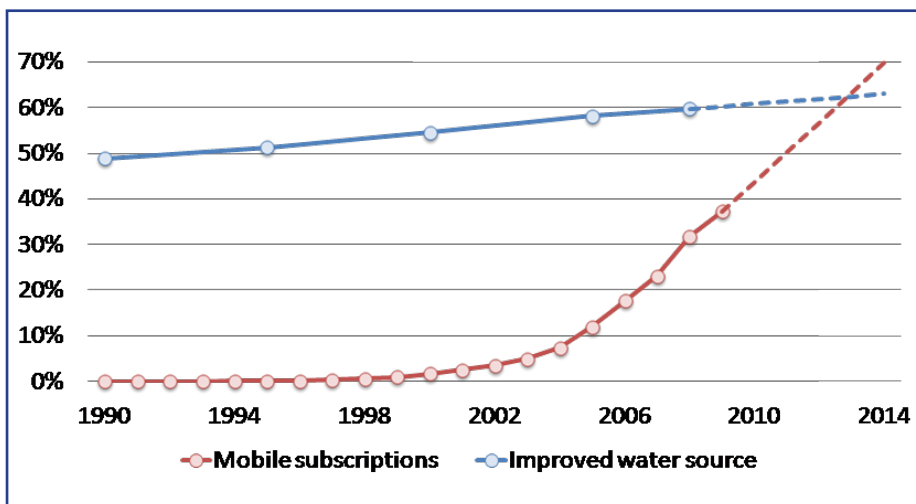


Fig. 4. % handpumps non-functioning in selected African countries

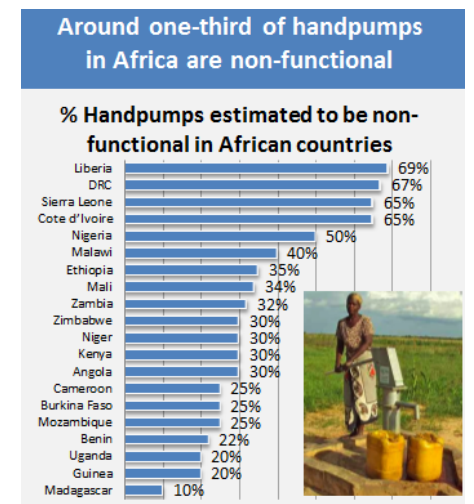




Fig. 5. Mobile/water for development: <http://oxwater.co.uk/>

maintenance support that exploits economies of scale can be reached via a low-cost text message. This can dramatically reduce handpump 'down-time' and the associated health, time and income costs. Alternatively, 'smart handpumps' installed with a low-cost, mobile transmitter device can automatically send real-time information on pump use and performance to trigger maintenance alerts. The 'smart handpump' information generated allows government and donors to observe performance and impacts at low-cost and at scale over time driving accountability and transparency through open-access information portals. Water supply risks are pooled or shared at scale with the mobile information platform which can drive cost-efficiencies and generate performance metrics to inform more effective and equitable investment decisions.

4 DEVELOPMENT DIVIDEND

Mobile technologies offer significant opportunities to accelerate and maintain water access in developing regions as network coverage and handset ownership has expanded rapidly reaching the poor as well as the rich. With 67 million more people without safe water access in 2008 compared to 1990, financial, technological and institutional hurdles need to be overcome. Mobile water payment innovations offer one mechanism to partly address the financial deficit of USD9 billion per year to reach the MDG for water and sanitation access in Africa. Water service providers, water users and mobile operators all can generate benefits from mobile payments. Yet mobile payments may only reach the one in six Africans with an individual piped water connection. Smart standpipes which can securely deliver water to the majority of

low-income water users offer benefits from a regulated tariff rather than inflated, non-utility water prices. Information generated by mobile payments and smart standpipes can drive institutional and regulatory performance that measure and reward, or penalise, sector performance with greater accountability and transparency. However, the most water insecure globally are rural residents counting for four of every five people without safe water.

5 REDUCING RURAL WATER RISK

Living in rural areas has long been synonymous with being poor and water insecure. Established rural handpump models transfer water supply risks to local water users least able to cope with them. Mobile technologies are now challenging this orthodoxy with innovative crowd-sourcing approaches where central

6 DIAL 'M' FOR WATER SECURITY

Mobile communication innovations have rapidly created an inclusive, secure and low cost architecture for financial and data flows that can reduce or share risk and enhance water security. Emerging mobile water initiatives are fragmented, largely driven by industry and with significant but unknown societal and hydrological impacts. Mobile communication innovations have charted new pathways for water security and though it is premature to determine the scale and sustainability of impacts for ecosystems and social welfare, the architecture for transformative change is compelling (Fig. 5).