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Developing competences for water utility change programmes

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African and Asian urban water sector organisations recognise the need to support performance improvement and organisational change programmes to meet the growing demands for improved services in challenging environments. Yet many such programmes have not resulted in the desired service improvements. This paper looks at three successful water utilities in Africa and Southern Asia to identify the factors that are contributing to substantial service delivery improvement. This analysis is used to inform the competencies required of senior managers and engineers responsible for water utility change programmes. How to develop the necessary competences through targeted management development programmes is considered by reviewing selected urban water sector management development programmes in India and Africa. Increasingly engineers working in the developing world are expected to focus on effective service management in challenging environments, and develop appropriate competences.

1. Introduction and background

In sub-Saharan Africa an average of only 35% of urban residents have a piped household supply – a situation that is repeated across developing countries worldwide. In Africa the increase in the use of improved drinking water sources is barely keeping up with the urban population growth and poorer households purchase water from alternative providers, or use unprotected water sources (WHO/UNICEF, 2010). This situation contributes to inequity and poor levels of public health and family well-being. The water utilities and municipalities charged with responsibility for viably improving access to piped services by urban populations, and the growth and sustainability of urban water provision, face a huge challenge. This responsibility inevitably falls on engineers who often find themselves promoted to management positions without having sufficient management experience or expertise. Their task is one of facilitating change in entrenched bureaucracies hindered by insufficient capital and human resource investment and political interference. Staff may or may not have adequate qualifications and organisational investment in human resource development is also inadequate. While a myriad of general management training opportunities exist around the world, few courses adequately support staff in dealing with such complex local water management scenarios. Although a limited number of utility managers may be able to obtain sponsorship or self-finance postgraduate business administration degrees and vocational management qualifications, the majority of engineers are broadly unable to access suitable management development opportunities.

What are the key competences needed by managers and engineers to drive utility performance improvement and

organisational change programmes in such challenging environments? Understanding performance is critical to developing appropriate capacity development for the urban water and sanitation sector. Competency requirements that have been developed may differ, depending on who is conducting the analysis – government, donor or urban dweller – and this fact matters in determining the effectiveness and value capacity building brings (Coates, 2007). It is, therefore, important to seek to develop a common understanding of the type of competences required to manage effective utility change programmes.

This paper draws on recent literature relating to developing country urban water utility success stories, and ongoing dialogue with and visits to utilities in Uganda, South Africa, India and elsewhere over recent years. It extracts key service improvement success factors in the context of complex organisational change, in order to inform the range of competencies needed by engineers and managers. Lessons on how best to develop utility management competences through targeted management development programmes for urban water sector staff are developed based on previous programmes in India and Africa.

Specifically the paper examines the main factors that are enabling the National Water and Sewerage Corporation (NWSC) in Uganda, the water utility in Phnom Penh, Cambodia and the eThekweni Water Department in Durban, South Africa to achieve success. These organisations are selected because of good performance levels in recent years, successful internal organisational change management programmes and considerable achievements in serving poorer households in their respective cities.

2. Ingredients of success for leading public water utilities

2.1 Overview on reforms

Management of services such as urban water supplies by traditional bureaucratic governmental institutions has proved to be ineffective. A new public management (NPM) approach has emerged in recent decades, which can be defined as ‘a set of management approaches and techniques, borrowed mainly from the private sector and applied to the public sector’ (Batley and Larbi, 2004). The key NPM reforms for service delivery (adapted from Batley and Larbi (2004) and Nickson and Franceys (2003)) look towards:

- *central government focusing on an enabling role*, separating policy from service delivery
- *providing greater autonomy* to service providers to enable them to manage more effectively by having control over their finances, staffing and planning
- *decentralisation* of services management to local units or new agencies, to enable better responsiveness to service users
- *cost reflective tariffs* – moving towards tariff levels that reflect all costs including operation and maintenance, debt charges, depreciation and future investments
- *enabling improved accountability* of sector organisations for their performance, which usually entails improved transparency and reporting
- *competition or private sector* participation to encourage performance improvements
- *establishing regulatory structures* to review utility performance and set suitable incentives and penalties for providers and their staff; this includes setting up an independent regulator in some cases
- *improved responsiveness to service users* through measures, such as improved customer services and communications with users through a variety of channels
- *human resource development* linked to improved organisational performance.

These reforms when implemented provide an enabling environment where utility managers can realise tangible service improvements. While some of these NPM reforms have not been fully implemented in many parts of Africa and South Asia, they are evident for the three water utilities considered below.

Given the considerable room for improvement in the provision of urban water services in these regions, it is important to consider the enabling environment, or conditions that enable change, and the specific interventions of utilities that have performed well.

2.2 Performance overview of selected urban water utilities

The National Water and Sewerage Corporation (NWSC) provides services to the main towns in Uganda, including the capital Kampala. In 1998, the corporation had a large and inefficient labour force with overlapping roles and operating costs exceeding revenues (UNESCO-IHE, 2009). Since then NWSC’s management team has initiated a succession of change management activities resulting in a significant turnaround in performance (Table 1).

Similarly, Phnom Penh Water Supply Authority (PPWSA) in Cambodia has undergone a transformation over a 15-year time frame (from 1993 to 2008), with enlightened management and dedicated staff. As a result, the customer base has increased by 662% and unaccounted for water has been reduced substantially (Biswas and Tortajada, 2010).

The eThekweni Water and Sanitation Department (EWSD) in Durban, South Africa has 394 000 water connections. In the 1990s the utility served mainly commercial customers, and service coverage and quality to the poor townships surrounding Durban was limited. Now the department serves mostly poor residential customers and has achieved 100% service coverage using a variety of innovative water service options. It has also reduced unaccounted for water from 45% to 30% (WSP, 2009; Water Operators Partnership, 2009).

2.3 Enabling conditions for the selected utilities

2.3.1 Organisational autonomy and regulation

All three utilities have high levels of autonomy (McIntosh, 2003; Mugisha and Berg, 2008; WSP, 2009) to manage their own revenues and budgeting, as well as human resource management, including hiring, firing and development of staff. EWSD, however, is part of the Durban municipality which pays for some cross-subsidies and sets human resources policies, which limits the organisation’s autonomy to some extent.

It is interesting to note that in all three cases there has not yet been an independent regulator in place, but regulatory

Performance indicators	1998	2008
Total water connections	50 826	205 000
Staff/1000 connections	36	7
Unaccounted for water: %	51	33
Profit/loss	Loss USH 2.0 billion	Profits USH 3.4 billion

Table 1. NWSC performance improvements (USH: Ugandan shilling)

structures in various forms are evident for each utility. In Phnom Penh the utility is able to operate as an independent business-like institution without political interference, with checks and balances applied as stipulated in a landmark government decree in 1996 (Biswas and Tortajada, 2010). Witte and Marques (2010) conclude that incentive regulation in the sense of regulatory and benchmark incentive schemes have a significant positive effect on efficiency among utilities in Europe. This would suggest that successful utilities in the developing world will perform even better, once regulators are fully established.

In Uganda there have been performance contracts between the government and the NWSC since 2000, which provide some degree of regulation. Their purpose was to set agreed targets against key commercial indicators such as billing efficiency and working ratio (operating costs/revenues). For water tariff adjustments, the NWSC utilises an annual tariff indexation policy, which is based on a formula agreed with government. NWSC's head office oversees the work of the area service providers (operators) in each town, who are responsible for day-to-day operations management. The office is also responsible for large-scale investments, asset management, operations support and performance monitoring. Since 1998, there has been a progressive increase in managerial autonomy granted to the area service providers through structured internal incentive contracts (Mugisha and Berg, 2008).

2.3.2 Accountability and performance-based incentives

The internally delegated area management contracts (IDAMCs) between NWSC headquarters in Uganda and the area offices provide a means for NWSC to delegate its obligations under its performance contract with the government, setting out performance objectives and incentive packages for staff. The IDAMCs are now central to NWSC's strategy for improving services and revenues. NWSC has established a monitoring department to oversee the agreement of the IDAMCs and manage a system that tracks the fulfilment of the agreed targets. Such incentives have contributed to NWSC's annual turnover more than doubling over a 7 year period (Mugisha and Berg, 2008). In both Phnom Penh and Uganda utility personnel receive competitive salaries, with sizeable bonuses for good performance (McIntosh, 2003; NWSC, 2010). Adequate staff salaries and incentives is an important enabling factor for effective utility performance improvement programmes.

2.4 Key change interventions

Key interventions that contributed to substantial performance improvements in the three utilities are discussed below under strategic themes.

2.4.1 Well managed organisational change programmes

The National Water and Sewerage Corporation (Uganda) and

EWSD (South Africa) commenced change programmes with open and honest analyses of 'where they are now' together with their staff, considering performance against key indicators. They also used detailed strengths/weaknesses/opportunities/threats (SWOT) analyses as a means of determining priority activities as part of their performance improvement programmes. (Mugisha and Berg, 2008; WSP, 2009). In Uganda senior management created competition among the various operating teams through the incentives in the performance contracts with different area offices, but also by openly praising the better-performing teams.

Each utility ensured good progress against the key technical, customer, managerial and financial targets as described in their business or strategic plans, delivering what they promised. All three utilities have benefited from effective long-serving managing directors who have overseen effective change programmes. Increasingly good leadership styles in public services management needs to be collaborative (McKimm and Philips, 2009), working with staff and key stakeholders. This collaborative style by senior staff is evident in all three organisations. In each utility substantial organisational restructuring took place reducing the numbers of levels to produce flatter structures, with clearer delegation of work to staff. The Phnom Penh utility also promoted dynamic, younger, well-qualified staff to senior positions to accelerate the pace of change. In Uganda flexible organisational structures were considered with considerable collaboration between departments, as a means of encouraging 'problem-solving' behaviour (UNESCO-IHE, 2009). Some donor support has contributed to service improvements in the case of NWSC and PPWSA.

2.4.2 A customer services focus with good systems

Being responsive to consumers with good customer services was the main driver of the reforms at NWSC, making it easier for customers to connect, pay bills, raise concerns, while being responsive to their requests and providing a variety of channels for communication. A key initiative was the creation of a well-staffed customer care section in the utility that was able to reduce the numbers of their pending complaints substantially (Coates *et al.*, 2001). Given that many unhappy consumers do not complain, regular customer surveys were also conducted.

Equally, as reflected in the mission statement, serving customers is the cornerstone of EWSD's services in Durban. The utility carefully monitors how long it takes to address consumer queries and community service agents (CSAs) work in communities where non-payment of bills is high. The CSAs visit the relevant households to consider water conservation and debt repayment options (WSP, 2009). Having adequate and up-to-date data on customers is essential and each utility has developed good databases and associated customer computer

systems. Both NWSC and EWSD use geographic information system (GIS) mapping linked to their customer databases as a means of being more responsive to queries and problems.

2.4.3 Increasing revenues and managing costs

[3] The National Water and Sewerage Corporation is now considered to have a high long-term credit rating of A, with a 5 year compound growth in revenues of 19% up to 2008 (WSP, 2010). EWSD, as part of the municipality has a long-term AA credit rating, while PPWSA in Cambodia has increased its net profits every year from 1998 to 2008, with an emphasis on billing systems and adequate tariffs (Biswas and Tortajada, 2010). Tariff increases are important but are politically sensitive, so PPWSA made sure that customers witnessed and appreciated service improvements before increasing tariffs. In each utility, tariff calculations have considered all costs, including depreciation costs and debt charges. Reduction of non-revenue water has been addressed in a systematic manner by each utility, reducing both commercial and physical losses. To ensure fair and transparent billing, all connections need accurate meters, with 24 h water supply where feasible.

2.4.4 A focus on human resource development

[4] The eThekweni Water and Sanitation Department's mission statement highlights the importance of staff in providing good services. The utility uses a range of indicators to monitor the composition of their staff, their capabilities at each level and human resources issues such as average time to recruit and staff grievances (WSP, 2009). In all three utilities, the appointment of senior staff with good qualifications is evident (WSP, 2009). Each organisation also ensures that timely training is arranged to address identified skill gaps.

2.4.5 Flexibility and innovations in serving the poor

[5] In Phnom Penh the utility initially sold water to community representatives in poor areas, who would resell water to their neighbours at much higher prices. Now the 'absolute poor' are entitled to pay less for their connection fee and can receive a subsidy on consumption if they consume less than 7 m³/month. This has dramatically increased the number of poor household connections. The high growth in new connections in Kampala is in part attributable to the reduction of the connection fee by NWSC. What is striking in both Durban and Uganda is flexibility and innovations in developing service options that suited people living in informal settlements. In Durban alternatives to full-pressure house supplies, including a trickle-feed ground tank and roof tank, were developed, marketed and used extensively (Sansom *et al.*, 2003). In Uganda NWSC has experimented with water kiosks, which tended to be expensive because consumers had to pay for the water-vendors' time. Options that have proved cheaper for consumers are shared yard connections and prepaid water meters. The latter seem to be particularly popular where they have been introduced. In Durban they have also used GIS

systems using regularly updated aerial photographs to track the development of informal settlements in order to respond more quickly to new demands for services.

Many initiatives have proved successful in these three utilities, although there is still room for improvement. In particular, the use of effective asset management to enable better targeting of capital investments, as has been done in the UK (Banyard and Bostwick, 1998). Other focus areas for the future include sanitation and continuing to extend and improve services in the growing low-income communities. [6]

3. Competences for managing utility change programmes

Competencies are a signal from the organisation to staff of the expected areas and levels of performance. They provide the individual with a map or indication of the behaviours that will be valued, recognised and rewarded. Originally competency frameworks consisted mainly of behavioural elements – an expression of the softer skills involved in effective performance such as communication skills. Increasingly, however, competency frameworks have become broader and more ambitious in scope and include more technical competencies. A critical aspect of all frameworks is the degree of detail. If a framework is too general (containing only general statements about communication, team working, etc.), it will not provide enough guidance either to employees as to what is expected of them or to managers who have to assess their staff against these terms. Competency frameworks are now seen as an essential vehicle for achieving organisational performance through focusing and reviewing an individual's capability and potential. Moreover a competency framework can be a key element in any change management process by setting out new organisational requirements (CIPD, 2010).

The competencies (skills, knowledge and experience) that are needed by senior management teams for transformational change in developing countries are listed in Tables 2 and 3, under key themes. This is based on an analysis of the case study organisations, as well as the experience of the authors in lecturing on utility management programmes. Note that one person would not normally need to have competency in all aspects, but good expertise in all these areas would be beneficial among the senior utility staff as a whole.

In utilities where only incremental change can be expected, the required competences would be less comprehensive. Engineers tend to be stronger on the technical and financial elements of utility management, so invariably they need to develop their softer competences in management and customer services aspects.

Effective corporate governance in terms of establishing and maintaining effective relations between the utility and key

Theme	Competences
Performance management	<ul style="list-style-type: none"> • Developing and sustaining results-based management • Performance monitoring using all key performance indicators, including effective performance reporting • Open analysis of 'where are we now' using performance data and working with relevant stakeholders • Business planning incorporating viable objectives, targets, strategies and policies for achieving them • Organisational development and restructuring, with a collaborative leadership style to enable effective delegation and inter-departmental collaboration • Contracting out services to reduce costs and improve services • Overseeing the development of user-friendly and reliable computer systems to support all utility functions
Financial management	<ul style="list-style-type: none"> • Maximising utility revenues while maintaining good levels of customer satisfaction • Budgeting linked to viable plans and business objectives • Commercial accounting and reporting, utility payments and cash flow management • Increasing revenues through improved billing and collection linked to customer services • Managing costs and achieving savings • Financial analyses using key ratios and other tools • Demand assessment and investment planning • Tariff setting linked to business plans, making the case for tariff increases • Seeking and managing external grants and loans; negotiation and reporting
Management of infrastructure services	<ul style="list-style-type: none"> • Assess current and future demands for services in the service areas • Design and construction of water and sewerage infrastructure • Management of capital investment programmes linked to future demand projections • Management of operation, maintenance and repairs linked to good asset management planning and water quality testing • Reduction of non-revenue water in line with agreed targets in conjunction with other departments

Table 2. Utility competences for managing utility change programmes – Part A

external government and regulatory stakeholders, including the utility management board, is also important. Most utilities manage water and sewerage services, but in some cases on-plot sanitation is also part of a utility's responsibilities, in which case some different competences would need to be added.

4. Targeted management development

High-performing organisations not only serve more customers but also invest in well-targeted staff development programmes that assist to increase knowledge, challenge prevailing attitudes and accelerate organisational change. As stated, engineers in

these organisations are seeing the benefits of employer-led investments through salaries and performance incentives. Utilities elsewhere are not faring so well.

Interviews undertaken by the authors with service delivery organisations that are not performing to the levels experienced in Uganda, South Africa and Cambodia, reveal engineer-managers facing difficulties in making even incremental changes. Responses from engineers in India reflected demand for those competencies identified above, particularly in respect of building leadership qualities, personnel management and

Theme	Competences
Customer services	<ul style="list-style-type: none"> • Developing effective communication channels both for the utility and consumers using a variety of media • Making it easier for customers to connect, pay bills and raise concerns, while being responsive to their requests and complaints using appropriate computer systems • Effective customer relations management in terms of improving customer satisfaction, but also managing their expectations where resources are limited • Inter-departmental collaboration and developing systems to respond to customers better
Managing change programmes	<ul style="list-style-type: none"> • Facilitating open organisational performance reviews • Developing, implementing and monitoring performance improvement programmes together with staff and consultants to achieve objectives • Building alliances among key stakeholders and staff to support change • Developing effective strategies to overcome staff and stakeholder resistance to change • Overseeing collective and individual problem analyses and option development • Reviewing and adapting change programmes in the light of experience
Human resource management	<ul style="list-style-type: none"> • Management of staff linked to organisational performance, including performance appraisals, person specifications, job descriptions, hiring, firing, staff development and training • Developing good communications within the utility using appropriate systems and channels • Overseeing effective utility teams and inter-departmental collaboration
Services for the poor	<ul style="list-style-type: none"> • Surveying and analysing current water services and coping strategies of low-income communities. • Developing effective service options for consumer groups who are not able to have house water connections, considering barriers such as lack of space. • Assessing consumer preferences for different service, payment and local management options • Developing flexible plans for serving low-income areas, working with community groups, alternative water providers and other stakeholders • Implementing and managing services in low-income areas in conjunction with partners, enabling effective operation and maintenance, cost recovery and service extensions

Table 3. Utility competences for managing utility change programmes – Part B

improving motivation, organisational capabilities, crisis management and computerisation. Surprising requests included social mobilisation, suggesting realisation at least that consumer orientation and services for the poor are important. An ability to form relationships with elected representatives and senior officials was also considered important. Experiences in developing and delivering targeted management development programmes for engineers and managers who faced difficulties in implementing change are outlined below.

4.1 Management development programme for senior urban water professionals in India

In the 1990s the Department for International Development (DFID), UK funded the MDSUPHO (management

development for senior urban public health officials) annual training programme in India. Key elements of the phased training programme included:

- (a) Phase 1 – 2 weeks' utility management training
- (b) Phase 2 – field visit to an Indian city; group work on performance improvement plans
- (c) Phase 3 – participants implementing changes in their own organisations
- (d) Phase 4 – review and reinforcement.

The learning objectives focused on developing knowledge and skills in the various elements of utility management, particularly in financial analyses. A key learning objective was to

improve participant ability and willingness to plan and implement performance improvements. Phase 2 enabled participants to gain valuable practice in analysing the real municipal water services situation in a city and developing draft performance improvement plans with other participants. A wide variety of training methods were used to maximise participation interest. An independent UK government review of the MDSUPHO programme in 1999 concluded that it was a well-designed and implemented training programme, but agreed that participants could not sufficiently implement the ideas emerging from the course in their own organisations. Reasons for this included insufficient autonomy of municipal water departments and water boards and poor incentives to implement the necessary changes, coupled with a lack of critical mass.

4.2 The Change Management Forum for urban water services in India

As the MDSUPHO course participants were not able to implement what they had learnt, an expanded programme was developed – the Change Management Forum (CMF), which was led by the Administrative Staff College of India (ASCI), with support from Water Engineering and Development Centre (WEDC) at Loughborough University and Cranfield University, UK. The CMF, India was a demand led initiative by government, municipalities and engineering colleges in response to the problems identified throughout the MDSUPHO experience and the urgent need to unfreeze management potential against a backdrop of limited government reforms. It was based on the following premise: despite best efforts and resources urban piped water supply coverage was too low; technology was not the problem, staff and organisational inadequacy remained a key constraint. The CMF in 3 years inspired engineers and administrators to make major and incremental changes to municipal water services. The approach was simple. Expose key staff to what can be done, provide mentorship for them to plan and make changes, and then provide a platform for them to share their experiences. Municipal commissioners and mayors became actively involved.

The CMF key objective was increased awareness and demand for change and management development in the sector. This was done through seminars, a dedicated website, a professional newsletter, study tours to other water boards, benchmarking databases, case studies and dissemination of research; also used were management development training, facilitation of dialogue between utilities and training institutions, and training material (WEDC, 2003). The photographs in Figures 1 and 2 were taken at two of the CMF events held. Interestingly the approach was relatively low cost and independent and therefore could not fulfil the donor's need to disperse funds only through large programmes. ASCI have



Figure 1. A question and answer session on non-revenue water as part of a study tour to Bangalore, India. This was organised by the Administrative Staff College of India, as part of the Change Management Forum

since gone on to be a major player supporting the Ministry of Urban Development and Poverty Alleviation in promoting and supporting change in urban water service around India, including running targeted management development courses.

4.3 Performance improvement plan training for African water utilities

The Africa Water Utilities Partnership (WUP) supported six African water utilities in 2003–2004 to develop effective performance improvement plans (PIPs). Following technical audits at each utility, they were supported in developing PIPs through a structured process of site visits, training delivery and participatory working sessions with groups of three or four



Figure 2. Group discussions on supporting sector capacity building as part of a Change Management Forum seminar at the Administrative Staff College of India in Hyderabad



Figure 3. Staff from a utility in Southern Africa developing their utility draft performance improvement plans at a training programme in Durban that was managed by WEDC and Severn Trent Water International

people from each utility. The photographs in Figures 3 and 4 were taken at two events at a training workshop held in Durban, South Africa. The project culminated in a large workshop in Cape Town, where each utility presented their



Figure 4. The head of water and sanitation at the eThekweni water utility demonstrating the uses of GIS mapping systems to participants as part of performance improvement planning training in Durban

PIPs. The workshop and overall project received favourable assessments. One of the more successful features of the project was the exchange of experiences and ideas between the participating utilities through exposure of weaker organisations to more progressive ones (Severn Trent Water International/WEDC, 2005), similar to the approach taken in India. Future programmes would benefit from more visits to utilities who have successfully implemented change programmes; and the linking of activities to longer-term benchmarking and exchange visits, thus enabling better-performing utilities to support other nearby utilities over a number of years. The involvement of local or regional training providers in such projects could potentially allow for more regionally based water utility management capacity development programmes.

5. Conclusions

Increasingly engineers working in the developing world are expected to focus on effective service management and developing appropriate competences to meet demands for improved services. The three water utilities examined, who serve Phnom Penh, Uganda and Durban, have achieved substantial improvements in performance and successful organisational change programmes, despite working in a challenging environment, with high percentages of their consumers having low incomes. The key enabling conditions that have allowed the utilities to make the necessary changes include high levels of autonomy to manage their own revenues and budgeting, as well as effective human resource management including hiring, firing and development of staff. Good levels of accountability through some form of regulatory structures were evident, although independent regulators have yet to be created for these utilities. Adequate incentives and salaries for staff were an important part of the reforms. Without such enabling conditions it is difficult for utility managers and engineers to make improvements and develop their own competences.

There is considerable commonality between the utilities in terms of the type of key interventions that enabled the service improvements. These included well-managed organisational change programmes developing flatter more flexible organisational structures, with open situation analyses with staff, leading to joint performance improvement plans. A customer service focus was central to the reforms in each utility, with the development of user-friendly computer systems. Increasing revenues and managing costs was done in conjunction with investments, as well as better human resource management related to organisational objectives. The three utilities were innovative and flexible in their approaches, adapting to local circumstances. This was particularly evident in the way they developed service options

and increased the number of connections in low-income areas in a sustainable manner.

When considering what competencies are appropriate for managers and engineers engaged in water utilities management in the developing world in the future, it is important to learn from what has worked well, such as the three cases considered in this paper. Competency frameworks need to be succinct but sufficiently detailed to give clear indications of the behaviours that are likely to succeed and be rewarded. A competency framework for senior water utility management teams working in developing countries is proposed in this paper under key themes. In utilities where only incremental change can be expected, the required competences would be less comprehensive.

Engineers working for high-performing utilities with good remuneration packages, who are seeking promotion, can often invest in the development of their own management competences, particularly if they receive support from their utility. However, many engineers in the developing world are not able to access appropriate management development programmes. Well-targeted management development courses can be a cost-effective means of supporting such engineers. The content of such courses should focus on the key competency areas identified, addressing the particular needs of the participants. This can be done effectively through encouraging participants to analyse real utility situations in urban areas and by developing suitable and comprehensive performance improvement plans. This can assist practising engineers in designing and implementing change programmes. More well-designed and targeted utility management development programmes, working with local training providers in the respective developing countries, are necessary to meet the growing need for effective utility managers in the developing world. Increased funding for such programmes should be considered both by governments and by international donors.

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WHAT DO YOU THINK?

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