The world economic crisis has savaged government finances. Policy makers are facing the harsh reality of substantially diminished revenues at a time when social protection services and business support schemes are in great demand. Given mounting public debt as well as budget deficits ranging from 6 to 12 percent of Gross Domestic Product (GDP) in developed regions and 5 to 6 percent of GDP in many developing countries, 2010 looks to be a difficult year for politicians and administrators trying to assure the delivery of essential public services. Even governments currently using stimulus spending to compensate for financial shortfalls are discussing so-called exit strategies, in the knowledge that such large-scale borrowing cannot continue indefinitely.

The effects of the deterioration in public finances are likely to extend to official development assistance budgets on which many low-income countries rely, depending on the funds to supplement their volatile commodity and trade-related revenues. Sub-national governments are in an even tighter bind, with limited authority to raise revenues on their own and no possibility of tailoring monetary policy to local economic conditions.
3.1 Why e-services?

Short of devaluing currencies or defaulting on public debt, governments are finding themselves with few options as they try to balance diminished revenues and increased expenditures. The most immediate response would be to reduce public services. Indeed, policy makers in both high- and middle-income countries are considering austerity measures of the sort once reserved for low-income recipients of multilateral financial aid. In so doing, social protection, health and education budgets will inevitably come under pressure. Another approach, less reactive and more strategic, is to mitigate the effects of the crisis on public finances by enhancing public sector capacity – providing services more efficiently as well as more effectively and aligning them with the results people expect. But how?

Here e-government can play a very important role. Just as technology has always been an important determinant of productivity in the broader economy, so too is the application of information technology in the rate and quality of public service delivery. In a time of economic stress, improved communications and faster response times can make a critical difference to those most at risk.

The overall trend of e-government development is conducive to such efforts. The number of initiatives related to e-government has continued to grow. In Australia, the Internet has replaced contact in person and by telephone as the most common way citizens make contact with their government. Since the United Nations E-Government Survey was launched in 2003, there has been steady progress in the implementation of the electronic delivery of government services (e-service delivery) in both developed and developing countries, and by now the benefits are well known.

Chief among the benefits of e-service delivery are efficiency gains. Efficiency is especially important given the current financial crisis, which has drastically increased demand for public services, including unemployment benefits, food vouchers, health services and the provision of information on debt relief. The British Financial Services Authority is a case in point. Overwhelmed by the demand for face-to-face debt advice, the Authority launched a new website to facilitate the provision of debt-related information.

In addition to new initiatives, some countries may also benefit from existing e-government infrastructure. Singapore has provided rapid cash transfers to those most in need, including older persons and members of other vulnerable groups, by linking the databases of different government departments with the direct deposit systems of the nation’s banks. These e-government efforts can make a difference to citizens, especially in a country such as Singapore, which has allocated some 52 percent of its stimulus funds to social protection measures, and which has a high level of e-government development and a corresponding agility in the delivery of public services under a variety of conditions.

In other countries, reports about the slow distribution of stimulus funds to citizens and businesses are reflections of the limited administrative capacity of government agencies. This situation has prompted some countries to initiate accelerated service delivery through online channels. The United States has created a website for processing stimulus grants that guides prospective recipients to benefits for which they may be eligible. The United Kingdom’s website Real Help Now provides detailed information on stimulus opportunities for homeowners, pensioners and employers, as well as those looking for a job or needing assistance with personal finances. Initiatives are broken down by region and accessed through an interactive map. What these and other initiatives have in common is a relatively high degree of e-government development as a result of prior, related investments.

Public feedback and collaboration will not guarantee better service delivery but, at very little cost to the taxpayer, participatory methods can help policy makers set priorities, encourage more citizens to ‘buy in’ to programmes, increase satisfaction levels and thus augment the chances of successful policy outcomes. For example, social networking sites such as Facebook, YouTube and Twitter, as well as blogging software and mobile technology, allow governments to tap into the collective knowledge of society quickly and directly. In this way, citizens move from being passive consumers of government services...
to advisers and innovators contributing ideas that are in better accord with their individual and group needs.6

Despite speed, efficiency, citizen participation and other benefits of e-service delivery, the usual caveats apply. E-services cannot substitute for traditional methods if citizens do not have ready access to the requisite infrastructure (including a reliable supply of electricity), or if they lack basic education or the means to pay for access to the Internet. Measured in purchasing power parity dollars, broadband Internet subscriptions are 10 times more expensive in developing countries than in developed regions.7 Policy makers should also bear in mind problems related to time lags and the delayed impact of new e-government applications; the high failure rate of information technology projects; and the inevitability of rapid technological change, with the corresponding obsolescence of e-government systems.8 Moreover, the proportion of the Internet population providing original content to social networking sites is still very small, even in developed regions, which limits the scope of participatory public service delivery.9

These are and other constraints are also discussed in some detail in chapter two of this report.

3.2 Delivering e-services with a view towards achieving the MDGs

Fewer resources and greater demand – at heart this is a public sector delivery and capacity issue. The situation calls for greater agility, efficiency and reach of public services, especially in the sectors of health, education, gender, environment and employment, which are important in their own right and central to achievement of the MDGs. E-government can be of great use in this regard. The purpose of this section is to present the reader with some potential e-government solutions, based on the experiences of others, which may help public authorities to continue on the path towards internationally agreed development goals, despite the current economic situation. For each of five priority areas drawn from the United Nations Millennium Declaration, specific development problems and issues arising from the current crisis are briefly recalled, followed by possible e-government solutions and an account of recent actions.

3.2.1 Employment services for poverty eradication

The issue

Poverty eradication is one of the most urgent and compelling development goals. There is serious concern that the ‘near poor’ are becoming the new poor. The World Bank estimates that an additional 53 million people in developing countries will fall into poverty on top of the 130 million to 155 million who became poor due to the impact of the food and oil crisis in 2008. This crisis caused a drop in GDP rates in many developing countries, including in African countries, which registered a 2.9 percent fall, as seen in table 3.1.

Productive employment is the key element for poverty reduction. The current financial and economic crisis exacerbates large-scale structural unemployment, under-employment and poverty for many developing countries, especially those considered least-developed. The global economy has been relying on demand fuelled by credit rather than earnings from productive activity, greatly contributing to the ‘jobless growth’. Therefore, enhancing employment opportunities is an important and urgent issue for the international community.

Faced with the prospect of a prolonged global increase in unemployment, poverty and inequality, and the continuing collapse of enterprises, the International Labour Organization adopted a Global Jobs Pact on 19 June 2009. It is designed to guide national and international policies aimed at stimulating economic recovery, generating jobs and providing protection to working people and their families. Although the Pact was designed with all regions in mind, it may be difficult for developing countries with limited fiscal and policy space to promote job creation in the absence of innovative and cost-effective means of implementing the Pact. Against this background, e-government tools are increasingly considered as a potential solution.

Table 3.1 Real GDP growth (percent) before and after the economic crisis of 2008-2009

<table>
<thead>
<tr>
<th></th>
<th>Real GDP growth</th>
<th>GDP change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Before crisis</td>
<td>After crisis</td>
</tr>
<tr>
<td>2008 estimate</td>
<td>5.9</td>
<td>5.7</td>
</tr>
<tr>
<td>2009 projection</td>
<td>5.9</td>
<td></td>
</tr>
</tbody>
</table>

Source: African Development Bank (2009)
**Possible solutions**

Most of the policy options enumerated in the Global Jobs Pact appear to lend themselves to a variety of e-government responses. E-service delivery can contribute to efforts to address poverty, employment and the impacts of the financial and economic crisis.

In many countries, crisis-response measures aim to attenuate the effects of the economic crisis on employment, and e-government tools can play a significant role in ensuring that pro-employment policies reach their targets. Governments can provide online public information services to job seekers and online vocational and technical training and entrepreneurial skills development for those who have lost or are at risk of losing their job as well as to vulnerable groups.\(^\text{10}\) In addition, they can provide ICT-based assessment, tracking and monitoring of the activities of the unemployed through the various parts of the employment services system, which is useful in the current situation.

These potential solutions need to be innovative and geared towards pro-poor services for poverty eradication and employment, especially in rural areas, where the majority of populations in developing countries live. Such e-government orientation is deemed particularly essential in rural areas, as most national e-government programmes have tended to focus on internal efficiency rather than public service delivery, and are mostly focused on urban areas.\(^\text{11}\)

**Recent actions**

An innovative e-government response to rural poverty and unemployment is India’s e-payment system for the National Rural Employment Guarantee Scheme, which makes use of biometric smart cards. The card uniquely identifies every citizen, with a fingerprint scanner to the benefit of illiterate citizens. This card initiative was motivated by the need to ensure that the poor and marginalized receive wages and social welfare benefits intended for them.\(^\text{12}\) It enhances transparency and accountability. Pension and wages underwritten by the scheme are paid through these smart cards in many Indian villages.

Another example of an e-government initiative in employment is the multimedia project ‘Oman Royal Court Affairs – Mobile Recruitment’, which won the World Summit Award in 2009 with an electronic evaluation system that receives job applications via short messaging system (SMS).\(^\text{13}\) It was one of eight winners in a contest following on the United Nations’ World Summit on the Information Society, and is not identified as a direct response to the crisis. Every job application is processed in a few seconds and the recruitment process is completed in about two weeks. The system simplifies filtering of candidates by integrating the National Manpower Register with a mobile-based job application, screening and short-listing of jobseekers. Results of automated screening process are forwarded via SMS. The automated mobile recruitment system saves time, cost and effort.\(^\text{14}\)

The current financial and economic crisis has led governments in different parts of the world have taken explicit steps to reduce unemployment including the creation of websites as part of their response.

- Employment is among the discussion topics in My Better Estonia, a civil initiative that invites citizens to brainstorm for a better Estonia and to propose solutions for various problems, including those related to the country’s financial crisis. Public opinions are then published on a website and good ideas yielded by online brainstorming events nationwide are used in making policy decisions. As regards employment, the Ministry of Social Affairs is currently implementing a project that will create new jobs, based on citizen feedback collected online.\(^\text{15}\)

- Ireland’s website Losing Your Job, provides public service information to the newly unemployed and potential job-seekers with a user-tailored design that make it easy to access relevant information.\(^\text{16}\)

- In Belgium, the website Au Travail (Off to work)\(^\text{17}\) contains an application that allows job-seekers to find the specific employment measures and opportunities that concern them. Users can complete an online form describing their work history before being directed to stimulus measures about work and employment that are relevant to their profile. This presentation of measures allows citizens to assess whether they are eligible for some form of assistance under the country’s stimulus plan. If so, they are told how to apply; if not, they are advised on alternative measures.
The most recent initiative, in direct response to the crisis, comes from the United States. The newly developed SMART 2010 (short for Skills Matching and Referral Technology) is an e-government tool connecting unemployed New Yorkers with available jobs. A completed résumé in electronic format is fed into the State Department of Labor’s SMART 2010 system at a career centre. The computer program analyses résumés for skills and work experience and then electronically contacts unemployed New Yorkers via e-mail, recommending job openings in their areas based on their experience and skills. Within 24 hours of submitting a résumé, the individual will receive an e-mail message containing job matches from a database of employment opportunities.18

3.2.2 Weathering difficult times in education

The issue
There has been real progress towards universal primary education in many developing countries since 2000. But the current financial and economic crisis threatens the significant gains that these countries have made in improving education outcomes. Governments in developing countries have thus far managed to protect their education budgets from the crisis, yet it remains to be seen how long they can continue to do so. There are concerns over ability of governments to sustain educational expansion and maintain the quality of educational service.19 The crisis is reducing the ability of both households and governments to invest in education.

At the same time, there are new, beneficial developments such as allocation of stimulus funding to education. Not only developed countries (e.g. Finland, the Netherlands) but also some developing countries (e.g. Kenya, Mexico, Namibia, Thailand) have been using their stimulus packages for investment in education. The focus differs, however. Developed countries such as the Netherlands and Switzerland have focused on supporting professional schools for the unemployed. In contrast, developing countries (including China) tend to focus on primary education and access to education. The Thai stimulus package to respond to the current financial and economic crisis includes a 15-year free education policy that aims to reduce the financial burdens on parents and enable Thai children to have equal access to high-quality education.20

The overall impact is too early to assess, yet there is a sense of real danger that some developing countries, which have made progress towards the Millennium Development Goal of universal primary education, will suffer setbacks as result of the financial and economic crisis. Countries such as Bangladesh, Ethiopia, Mali, Rwanda and Senegal are at particular risk.21 Aid to education had already begun to fall prior to the crisis and may further drop by $1.1 billion in 2010, according to the 2009 Education for All Global Monitoring Report. Nearly 75 million children are out of school, the report says.22 Case studies of countries such as Mongolia show that the financial and economic crisis has had a major impact on school attendance and school quality, increasing school dropout rates at every level of schooling.23 This finding is in contrast to the past Asian financial crisis of the 1990s, when school enrolment rates did not decline as much as feared, partly due to household and school-level adjustment.24

Possible solutions
E-government delivery of educational service can help countries to weather difficult times in education. It is a powerful medium for education, with 24-hour Internet accessibility over distance. The reach of schools can dramatically be expanded. The ever-increasing possibility for remote education is particularly exciting and important for developing countries. Generally speaking, potential e-government solutions include provision of information on topics such as finding a school, identifying the right colleges for students, finding teaching opportunities for teachers, and receiving test results. Solutions may also be found in the use of ICTs to enhance student education and teacher training.

If these potentials are to materialize, e-government services for education need to be underpinned by affordable and reliable Internet connectivity and other vital infrastructure such as school computers and universal access facilities where ICT can be effectively used in educational and training tools.
The use of ICT in education is too often constrained by a lack of computer stations and other infrastructure. Ensuring the basic infrastructural backbone has been and continues to be a major concern for developing countries.

Recent actions
In developed countries, stimulus packages are prompting substantial new initiatives in the educational sector. The United States’ stimulus package set aside $650 million to invest in school technology and broadband, cover expenses for schools to install or improve Internet connections to broadband, and to help teachers learn how technology can be used to improve their lessons. In the same country, several states initiated recent actions to monitor and analyze the effectiveness of their programmes, such as the use of Economic Recovery Fund Tracking technology by the Arkansas Department of Education. Through funding from the American Recovery and Reinvestment Act, states are now being encouraged to create statewide longitudinal data systems to help track student achievement. Also, on a different topic, it is interesting to observe how e-technology has been applied to deal with the outbreak of H1N1 flu (see box 3.1).

The current situation of financial hardship has motivated countries to place financial information online, including information about scholarships and financial aid. The Irish Government’s website called Student Finance is particularly useful in this regard.

In many developing countries, the focus has been primarily on ensuring that students and teachers have ICT skills (‘Education for ICT’) rather than using ICTs for better learning and teaching process (‘ICT for Education’). An example is the e-Schools Initiative of the New Partnership for Africa’s Development (NEPAD). Despite the current financial and economic crisis, the initiative has achieved some progress. Initiated in 2003, it aims to impart ICT skills to African schoolchildren, equip them with ICT apparatus, and provide teachers with ICT skills. It is a good example of integrated approaches with its teacher development framework for teacher training and professional development.

ICT applications are becoming more important for remote education and virtual classrooms. Long before the current economic crisis, several developing countries had initiated steps to provide education to students in remote areas. These include Mauritius’ Cyber Caravan Project, Egypt’s video-conference distance learning linking 27 sites across the country to provide learning facilities in remote areas, Guinea’s adult literacy programmes conducted via the Internet, and Burkina Faso’s Classe Rurale En Langue Nationales project, a distance-learning programme in local languages targeting rural people, including those who are illiterate. E-education services in Australia are successfully applied to overcome geographical distance and enable educators to reach remote communities (see box 3.2).

Mobile technology is becoming an important aspect of educational services, and it is a noticeable trend in the field of student education and teacher training. In the Philippines, the mobile phone and SMS are being used as the primary means for interactive learning and for providing information to students. In the United Republic of Tanzania, the BridgeIT project used mobile phones to provide support for teacher training. Mobile technology has rapidly gained in importance across the educational sector. Some even say that the current state of mobile education technology, or

---

**Box 3.1 Online alerts about schools and H1N1 flu**

Schools already face the challenges of financial and economic crisis. Add to this the threat of H1N1 flu, which is leading to increasing efforts on the part of United States government and school districts to put information online. Through such learning measures people can be alerted to possible closures or teacher and student absences because of a H1N1 flu outbreak. In particular, the United States Department of Education has asked Curriki – an open-source online repository of free curricular materials from commercial vendors, government and professional organizations and educators – to establish a ‘continuity of learning plan’ as part of a nationwide readiness initiative.

Source: Ash (2009)

**Box 3.2 ‘Shrinking’ Australia with e-education services**

When it comes to Australia, with its vast area and sparse population, going the distance and providing teachers and students with ICT educational tools is extremely important. E-education services help ‘shrink’ Australia. Motivated to invest in ICT by its geographical characteristics, Australia enjoys the benefits of remote education and is now home to many remote e-education companies.

Source: Smart Technology (2007)
m-education, may be at the stage where mobile health, or m-health, was just a few years ago. In Bangladesh, more than 50 percent of the population gained access to mobile phones in the past decade. Mobile applications for English-language teachers in Bangladesh enable them to access training materials including audio and video at all times.30 Soon the mobile applications will be linked to the Government’s school curriculum, textbooks and assessment procedures.30 Mobile devices (e.g. cell phones, handheld devices and handheld computers) are among the most ubiquitous technologies in children’s lives today in countries like the United States. Mobile applications are likely to become an important part of a more effective approach to learning in the near future, which has an important implication for governmental educational services as they prepare to facilitate and encourage ‘anywhere, anytime’ learning.

In addition to the emergence of m-education applications, there is an increasing trend towards learning as a more participative and collaborative process, which should be encouraged by governments. Learning is becoming a more participative and collaborative process in which Web 2.0 tools facilitate activities of teachers and students as co-producers of knowledge and educational content. An illustrative example is the School of Tomorrow project at the Aruba Pedagogical Institute, which has engaged in group-blog collaborations with Dutch students and others, incorporating ICTs into many aspects of teaching and learning in its technology-rich model classroom.31 It is also interesting to note that Iceland, one of the most crisis-affected countries in the world, has started promoting free and open source software in the country’s schools, which will open up new opportunities for more collaborative learning processes (see box 3.3).

### 3.2.3 Gender-inclusive approaches to public service delivery

**The issue**

Seventy percent of the world’s poor are women, and the financial and economic crisis has gender-specific impacts. Women tend to face greater income insecurity, and cuts in social spending also tend to disproportionately affect access to education and health services for women and girls. The United Nations Conference on the World Financial and Economic Crisis and Its Impact on Development recognized that crisis responses need to have a strong gender perspective.32

Including women in economic development is an issue high on the current agenda of the international community. There is consensus that the adverse impacts of the crisis on women’s economic empowerment, including women’s employment, present a major challenge to governments worldwide. Economic empowerment is mainly about securing economic opportunities. It includes mobilizing women to eliminate gender gaps in access to resources and services that are a major obstacle to women’s development. Microenterprise development, job creation and security, and above all, availability of microfinance loans are important.33

Access to the labour market has much to do with economic empowerment for women. Women are often in vulnerable employment and overrepresented in insecure, part-time and short-term jobs, including particularly, in the agricultural sector. As regards women’s unemployment, the Millennium Development Goals Report 2009 highlights its critical importance and notes that the crisis may hold back progress towards gender equality by creating new hurdles to women’s employment.34 The United Nations Committee on the Elimination of Discrimination against Women also warns that the current crisis is likely to have a serious impact on the realization of gender equality, especially in relation to employment.35

Female employment and microfinance are key issues arising from the financial and economic crisis. According to the World Bank, loss of

---

**Box 3.3 Promoting free and open source software in schools in a crisis-affected country**

The Ministry of Education in Iceland recently announced its plan to promote the use of free and open source software in schools across the country. This is based on the government’s policy on free and open source software for all institutions that are operated by public funds, with the objective of augmenting students’ skills in ICTs, which present cost-effective educational method for schools. The key advantage of open source software for education is its openness enabling any organization or individual to use free of charge, change and improve the software for one’s own use and thereby explore a new idea about learning. When combined with open software standards, open source becomes even more powerful, emerging as new kinds of software to support collaborative learning.

Source: ePractice.eu (2009)
employment constitutes the first round impact of the crisis on women and families, mainly as a result of the drop in aggregate demand and exports. Another important first round impact is the fall in lending resources from microfinancing institutions, as a result of tightened credit markets.36

It is in view of these problems, the United Nations Millennium Campaign has called for the establishment of a ‘vulnerability fund’ in which each developed country would devote 0.7 percent of its stimulus package to aid poor countries to set up safety net programmes, including microfinance institutions. Governments are also urged to design and implement the packages, with explicit consideration of the labour market disadvantage that women face, and set explicit employment growth targets for women.37 It is important to ask if the current stimulus packages contain gender-specific provisions for empowerment and employment opportunities (see box 3.4).

The gender impact of the economic crisis in terms of unemployment rates is expected to be more detrimental for females than for males in most regions, and especially so in Latin America and the Caribbean. Figure 3.1 shows gender-disaggregated employment-to-population ratios prior to the crisis.

Possible solutions
E-government can be effectively leveraged for women’s economic empowerment and employment in the crisis. Employment-related e-government solutions include online provision of information on job opportunities for women, in particular for women who can use skills for the global digital economy beyond the limits of their local economy; online skills training for female jobseekers; and online distance learning.

E-government can also enhance information service delivery for much-needed women’s economic empowerment. It can help women to weather the crisis by disseminating information on income-generating opportunities, and by alerting women to other relevant information services. Women need information about microenterprise loans and other forms of capital for female entrepreneurship, as well as local, regional and global market information and market pricing information. Indeed, uninterrupted flows of microfinance are key to the economic empowerment of women, especially in a time of decreased lending. E-government can provide information about financial and other forms of assistance provided by governments, international donors and non-governmental organizations. In addition to these information services, women need to know about online business training and support for women-headed microenterprises, online marketing assistance and online financial services.

A number of conditions would facilitate the delivery of information to women, including: (a) public access (e.g. mobile Internet kiosks, especially in rural areas); (b) free access to training on the use of the technology; (c) technological solutions that promote targeted access to women, such as voice recognition for people with little or no formal

---

Figure 3.1 Gender-disaggregated employment-to-population ratios

- **Developed Economics and European Union**: Male 2008 - 81.9, Female 2008 - 44.2
- **Central and South Eastern Europe (non-EU) & CIS**: Male 1998 - 89.0, Male 2008 - 68.7
- **East Asia**: Male 1998 - 70.0, Female 1998 - 59.3
- **South-East Asia and the Pacific**: Male 1998 - 59.0, Female 1998 - 57.0
- **South Asia**: Male 1998 - 36.7, Female 1998 - 17.6
- **Latin America and the Caribbean**: Male 1998 - 44.2, Female 1998 - 22.6
- **Middle East**: Male 1998 - 60.8, Female 1998 - 62.9
- **North Africa**: Male 1998 - 60.8, Female 1998 - 62.9
- **Sub-Saharan Africa**: Male 1998 - 60.8, Female 1998 - 62.9

*2008 are preliminary estimates Source: ILO (2009a)
education, graphic interfaces and touch screens; and (d) the provision of information that rural women in developing countries need in an accessible language and format.

**Recent actions**

Some countries have taken steps in fiscal stimulus packages to protect and increase funding to microfinance lending institutions, which are important to women's empowerment. It is also important that public expenditure monitoring systems are in place to ensure that stimulus funding and other budgetary allocations actually reach the intended groups, including women. In this regard, the latest ICT applications for tracking and monitoring of stimulus funding are likely to be useful, especially in countries like Uganda, which is one of the first developing countries to successfully implement a public expenditure tracking system and which has already built relevant capacity.

In direct response to the financial and economic crisis, China focused on women in the area of information service and assistance for female jobseekers and entrepreneurs. The Women's Federation of the City of LianYunGang made a significant effort to improve the female employment rate in the city during the current crisis. The Federation reported that more than 60 per cent of the female population was unemployed. Events were organized to strengthen employment placement services for women, and the Federation established a database for unemployed women. The qualifications of female jobseekers were analysed and the Federation then recommended women to various organizations for employment according to their qualifications. The database is updated once every quarter, which aids in monitoring the employment situation. The Federation also created a special website column, where women could post their experiences with successful start-up microenterprises and published handbooks for female entrepreneurs.

A good example of a microfinance initiative comes from India, where commercial banking entities including State Bank of India have linked with the respective Service Centre Agencies in the states under the framework of the National e-Governance Plan to provide Banking Correspondent status to the Common Service Centres equipped with ICT infrastructure, and have provided microfinance services through them. For the cost of sending an SMS message, the microfinance client uses an application stored on her mobile phone to initiate an account transfer to her bank account. Applications for microfinance may be led by the private sector, with government and non-governmental organizations in support. In this case, the government has also routed various developmental schemes through microfinance.

A trend observed is the growing importance of mobile usage, especially for women entrepreneurs, who need access to credit and capital. This development seems similar to the growing importance of mobile applications in other priority areas of the MDGs, such as m-education and m-health. There are some indications that it is one of the more accessible technologies for women. In fact, women’s mobile phone access in Africa is equal to that of men.

3.2.4 **Health care and the advent of m-health**

**The issue**

The financial and economic crisis may have a serious impact on the health-related MDGs. In the crisis, governments around the world are under increasing pressure to maintain the level and quality of health services with limited and decreasing resources. Even more demands will be placed on public health services as income decreases and governments cut their budgets. The crisis is expected to negatively impact HIV/AIDS treatment programmes in one third of countries surveyed in 2009, with its adverse effects worsening over the year. The crisis will inevitably impact and exacerbate many of the problems facing healthcare. Previous crises in Asia and Latin America show the negative impact that crises can have on access to health outcomes. Women and children are especially vulnerable.

**Possible solutions**

ICT applications in the health sector can bring efficiency gains, much as they can for education, employment and other priorities of the MDGs. ICT applications could, for example, improve the
monitoring of demand for and supply of HIV/AIDS drugs, which would be highly relevant given the current lack of funding for these drugs. The current crisis is intensifying the challenge of maintaining access to HIV treatment and prevention, especially in high-prevalence countries in Eastern and Southern Africa.42

ICT applications can engage citizens in participatory decision-making about health care, considerably expanding the scope of e-participation. These technologies offer the potential to empower citizens with medical information and knowledge that can facilitate improved decision-making and care. They can enable for stakeholders such as patient groups and providers to agree on priorities and then streamline services to make them more efficient, which can reduce costs and help to mitigate the impact of the crisis.43

**Recent actions**

E-health, a process of administering health care through ICT tools, is rapidly growing in importance in all parts of the world. Telemedicine, for example, is a process of accessing health care from a distance through ICT tools. Telemedicine has been successfully implemented in several developing countries, including Bhutan, Ghana, Indonesia, Niger, Nigeria, Pakistan, Peru and South Africa.

Electronic health records are another example of ICT use in this sector. The stimulus package in the United States contains $19 billion for health care technology spending and the adoption of electronic health records.44 The use of computerized medical records has slowly been adopted in many developed countries such as Singapore and several European countries. In Qatar, electronic health records are a key component of the national e-health programme for all, which aims to increase the efficiency and effectiveness of the healthcare system. The Supreme Council of Information and Communication Technology, ictQATAR, will first promote the standardization of health records and the creation of the Electronic Patient Record, and will then focus on providing online healthcare information and services through portals and applications with a view to developing an integrated health network.45

In the United Kingdom, recent initiatives are taking advantage of technology in innovative ways and building on Web 2.0 technologies. One example is the Wii platform development, which extends telehealth and telecare systems to include a range of new devices around the home. The technology creates a virtual community of connected carers and cared-for, and it enhances community-based care and health information. The aim is to help prolong independent living for elderly and chronically ill patients.46 Another e-health project is PatientOpinion, which allows patients of the British National Health Service to share their experiences at local hospitals, hospices and mental health services and to rate them based on criteria such as standard of medical care, being treated with respect and dignity, clear information and cleanliness.

More than half of all patients between the ages of 25 and 34 in the United States are influenced by social media when it comes to health care decisions, recent studies have found. Social media is a group of Internet-based applications that allow users to generate and exchange content, including blogs, wikis, podcasts, instant messaging and other social networking and communications software applications. The concentration of such activity in the most developed countries may result in an accentuation of the digital divide in health care, urgently necessitating a concerted effort for more inclusive e-health care on a global scale.

Using mobile phones, m-health stands out among the many emerging uses of ICT in healthcare. It delivers health services and information (over distance) to patients and has become a critical
segment of e-health in recent years. M-health is the fastest growing part of e-health, and its importance is increasing. Documented results reveal that mobile technology improves the efficiency of healthcare delivery. The rapidly increasing importance of mobile phones as a platform for healthcare delivery in recent years is mainly attributable to substantial price reductions and the resulting rapid expansion of mobile phone use around the world (see figure 3.2).7 There are presently 4 billion to 5 billion mobile phones in the world.

Mobile phone use has been rapidly expanding, especially in Africa (see figure 3.3). When compared to the growth rate of telephone lines, that of mobile phone subscriptions in Africa is dramatically faster.

Capacities of mobile phones are rapidly expanding to include voice, text messages, email and even full Internet browsers, leading many experts in the field of technology to agree that mobile access is the communication medium of the future. This offers unprecedented opportunities to improve the health of people living in underserved communities that lack health care facilities or medical staff. Information provided via mobile phones can help to diagnose and treat illness and assist in the early detection and containment of epidemics. For many countries, mobile technology may be the only feasible way to reach out to the wider population, especially in rural areas.

M-health has demonstrated a positive impact on health care and has the potential to deliver health care more efficiently. To date, key applications for m-health in developing countries and accruing benefits include:

- Disease and epidemic outbreak tracking and dissemination of public health information to citizens (e.g. AESSIMS system in India);
- Remote data collection and remote monitoring to closely track and minimize treatment interruptions (e.g. Cell-PREVEN initiatives in Peru, Dokoza System in South Africa);
- Medication reminders (e.g. reminders for tuberculosis patients in Thailand) and applications for protection of patients from fake medicines (e.g. mPedigree application to check drugs in Ghana);
- Diagnostic and treatment support in rural and marginalized areas (e.g. M-DOK project in the Philippines, Mobile Telemedicine System).48

The adoption of mobile phones as a platform for health care delivery can be found even in least-developed countries such as Rwanda (see box 3.4).

### 3.2.5 Keeping up environmental management

#### The issue

The current financial and economic crisis could have an adverse impact on a number of environmental services. There is concern that the environmental agenda could be sidelined, countries could be distracted from addressing climate change and other environmental problems, and they could potentially make substantial cuts in their investments in new technology and environmental services.

Cuts in funds could hurt environmental services, but there are also some positive developments created by stimulus packages in response to the current financial crisis. The rapid adoption of mobile phones in the region is one example of the potential for new technologies to contribute to the achievement of the MDGs.

### Box 3.4 Mobile phones support life-saving HIV/AIDS electronic records system in Rwanda

“Rwanda sees mHealth as part of a larger eHealth vision”

—eHealth Coordinator for Rwanda’s Ministry of Health

A major component of Rwanda’s e-health programme is the country’s rapidly growing m-health portfolio, which is being used to deliver vital health services even in the most remote rural areas. TRACnet is an electronic records system that can be uploaded to mobile phones. It was created in Rwanda in 2005 for remote data collection by the TRAC Centre, part of the Ministry of Health. The system is used to manage critical information on HIV/AIDS patients, ensure drug adherence, monitor anti-retroviral treatment (ART) programmes nationwide, and access the most up-to-date information about HIV/AIDS care and treatment. TRACnet was designed for use with all types of technology and information systems, but today 90 percent of the system’s users access it on their mobile phones. Given the popularity of mobile phones, Rwanda’s Ministry of Health is piloting a Phones-for-Health programme and has registered interest in using mobile phones to report on maternal mortality and to track progress towards reaching the health-related MDGs.
crisis. ‘Green growth’ makes up an important portion of stimulus packages after infrastructure investments, education and research and development, including specific ‘green measures’ in the proposed or announced fiscal stimulus packages in China, Germany, Japan, the Republic of Korea and the United States. Substantial amounts of money are directed at green technology research areas.49 Some tropical countries have announced stimulus packages with programmes such as Indonesia’s tree-planting and forest rehabilitation programmes.50

In most developing countries, the mobilization of funds and the proportion earmarked for green investment will be limited. Missing the opportunity to stimulate green investments in developing countries now, and to unlock low-carbon opportunities, even as their economies are in a downturn, could mean storing up problems for the future that are far larger than the current financial and economic crisis.

Possible solutions
Environmental protection needs to be an integral part of countries’ recovery from the crisis, and ICT can help countries to achieve their goals in more cost-effective ways. It is estimated that ICT-enabled improvements in non-ICT sectors could save about 15 percent of total carbon emissions by 2020. Significant ICT-enabled energy efficiency gains are expected to be achievable in the short term in buildings and construction, in transport, logistics and energy end-use. It is estimated that the wider use of applications such as online public services and applications, and advanced collaboration technologies could save at least 1 to 2 percent of total energy use by 2020 worldwide. For some, broadband is green technology. In fact, it is an enabler of efficiencies that could drive major reductions in carbon emissions.51

E-government applications are already in position to bring substantial gains for environmental transactional services including, for example, cash-back incentives for green products, subsidies, tax rebates and environmental permit applications. These efficiency gains are particularly significant at a time of financial and economic crisis, when many stimulus packages include direct public spending and tax incentives to support green investments.

ICT-enabled environmental services also include provision of public environmental information and data, and enhance opportunities for monitoring and public awareness. In an example from the water sector, the Seoul Metropolitan Government in the Republic of Korea recently initiated an online real-time water quality assessment service to assess and monitor the quality of tap water. With the system, citizens can check online and in real-time the quality of water supplied to their houses from water purification plants.52 In an example from the forestry sector, geographic information systems (GIS) are considered powerful tools for tracking and monitoring deforestation (see box 3.5).

Recent actions
Only recently have countries recognized the potential of ICT-based innovations to contribute to environmental issues. Yet they are already being recognized for their contributions, as in the case of an e-catalog for procurement by government agencies in the United States, which has improved the tracking and monitoring of green purchases.53 The country’s General Services Administration has been using social media tools to ask citizens how to do better at procuring environmental goods and services.

E-government has a uniquely low-carbon delivery process for its services, and this is being recognized for its positive impact to environment. In the United Kingdom, a study of the Sunderland City Council demonstrated how e-government service delivery can serve the environmental objectives of government. The study examined the carbon footprint of five services provided by the local government, and found that a shift towards

Box 3.5 Spatially enabled e-government tools for forest management

The Asian financial crisis provides ample evidence that illegal forest activities at both industrial and subsistence levels increase in terms of economic strife. Deforestation is an important climate change issue and a significant contributor of CO2.

E-government tools can support the environmental services offered by the initiative Reducing Emissions from Degradation and Deforestation (REDD) and related initiatives. REDD is a crucial strategy for dealing with climate change that requires slowing the growth of agriculture, forestry and cattle ranching to protect forests in places such as Brazil and Indonesia.

GIS can play an important role in assisting government agencies in tracking and monitoring. This system enables an effective use of geographic information, designed for the collection, storage and analysis of objects, where geographic location is critical to the analysis. It aids users in organizing the data about problems, understanding their spatial relationship associations, and analyzing and synthesizing information about them.

Source: ESRI (2009)
greater provision of these services via e-mail and the Internet would lead to a reduction in the Council’s carbon footprint.54

Governments were already grappling with many environmental issues prior to the crisis. After the onset of the crisis, some existing e-government tools were being scaled up or new tools were created. The spatially enabled e-government tools such as GIS, mentioned earlier, are increasingly being used to track and monitor environmental changes. A case in point comes from the United Kingdom’s National Weather Service, which features an interactive map on the Met Office website that demonstrates the impact of global warming in decades to come.

Another trend in e-government is the use of applications that enhance public participation to improve environmental service delivery. Social media tools enable active social networking and consensus-building among environmental activists, who are one of the most vocal groups. Some governments actively encourage citizen participation in combating climate change, using innovative e-government tools. Examples include the Climate Atlas of the German Federal Environment Ministry on the new online portal, Es ist Dein Klima (It’s your climate).55 The Atlas shows who is committed to tackling climate change in individual municipalities. The objective is to motivate citizens and encourage participation in combating climate change.

3.3 Conclusions

Faced with pressure to do more with less, governments find themselves in the position of having to be more efficient and agile in delivering public services in order to meet national development objectives. The ‘e’ of e-government services brings several important advantages in the current financial and economic crisis, most notably improved efficiency. These benefits, however, need to be assessed against existing constraints and limitations. Potential and actual e-government applications vary across countries and groups. Issues of public service delivery arising from the current financial and economic crisis also vary across countries and group. This high degree of variation is reflected in the many different e-government approaches taken in employment, education, women’s empowerment, health care and the environment – five selected priority areas of the MDGs. For example, ICT tools have helped female jobseekers and entrepreneurs find opportunities for jobs and loans; m-health has delivered vital health services even in remote rural areas of developing countries, including services for HIV/AIDS; and ICT tools have enhanced environmental monitoring and raised awareness through effective provision of public environmental information.

Across these varied sectors there are common features and trends, due in part perhaps to the shared experience of the financial and economic crisis.

• A major part of the current e-government activity entails the provision and delivery of information service, a finding common to the five selected areas of the MDGs. ICT-enabled transactional services have been used to meet the drastically increasing demand for social welfare and other benefits, and they have gained in importance and usage.

• E-transaction services present an important issue in connection with stimulus funding, not only to enhance transparency (see chapter 1 of the United Nations E-Government Survey) but from the perspective of public service delivery. E-government tools can expand and enhance public service delivery capacity through, for example, efficient processing and distribution of stimulus grants.

• Another important trend involves e-participation, closely linked to public service delivery. Many countries, especially developed countries, show increasing use of new Web 2.0 and other social media tools to create a more interactive environment between governments and citizens. Several countries have invested substantial resources and effort into experimenting with these tools, finding innovative ways to use them for more effective delivery of public services.

• One of the most noteworthy developments is the rapid and ubiquitous emergence of mobile technology as a powerful tool for public service provision and delivery, especially in developing countries. Mobile service delivery is becoming pervasive in employment, education, women’s empowerment and the environment but nowhere it is advancing more quickly than in the health sector. It is at an
A country’s capacity to achieve the MDGs can be greatly enhanced with the right e-government applications.

early and dynamic stage, and the scope of its application is rapidly expanding. The mobile platform is widely seen as the direction of the future and will continue to play an increasingly important role in public service delivery. Despite the current crisis, the mobile technology industry shows resilience. Governments responded to the financial and economic crisis by developing new e-government tools, scaling up existing initiatives and by refocusing or stepping up their overall e-government efforts. Some governments benefit from pre-existing e-government systems and initiatives. E-government work, which has already carried out has proven invaluable in the current crisis, allowing some governments to accelerate their e-government programmes, with a view to realizing benefits such as enhanced efficiency, effectiveness and financial savings on the delivery of public services.56

Looking ahead, constant progress in ICTs is driving rapid change, presenting both new challenges and new opportunities for public service delivery. Technological developments will continue to provide new possibilities for e-government to address both immediate problems such as those arising from the current financial and economic crisis and long-term challenges for public service delivery. At the present time, due to pressures on ICT budgets, many countries have cancelled or postponed their ICT projects. Ultimately, however, the crisis may act as a powerful catalyst for improvement in the delivery of public services by governments, which could prove advantageous in the long run.

Progress in ICT infrastructure will help advance e-government and service delivery in all areas including, in particular, those advancing the MDGs. It follows, for example, that the provision of interactive public services is high in countries with large broadband penetration.57 There are encouraging developments in this regard, especially in Africa, and despite the global financial and economic crisis. Rwanda, for example, continues to invest in ICT applications and e-government. In South Africa, the government has said that ICT sector would be used to deal with the current crisis. Plans to develop Internet connections in developing countries are making steady progress despite the global financial and economic crisis. The Eastern Africa Submarine Cable System has been successfully launched, which could drastically reduce the cost of Internet access in East Africa and landlocked central regions in the near future. The future progress of e-government depends on this kind of infrastructural progress.

E-government is practical today as well as being an investment in the future, yet an example from the past helps make the point. In the Asian financial crisis of the 1990s, the Republic of Korea continued and even enhanced its investment in ICT development and use of ICTs for public service delivery, experiencing particular success with its e-procurement system. This continuing investment contributed to the country’s economic recovery.58