Strategic Priorities of Digital Bangladesh

prepared by

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Prime Minister's Office

October 2010

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EXECUTIVE SUMMARY

Information and Communication Technologies (ICTs) were recognized by the world leaders as a key development enabler in World Summit on Information Society (WSIS) in Geneva in 2003 and in Tunis in 2005 (Tunis Commitment). In the Poverty Reduction Strategy of the country called National Strategy for Accelerated Poverty Reduction 2009 (NSAPR-II), ICTs were similarly identified and given due importance. The government's 'Digital Bangladesh by 2021' vision plans to mainstreams ICTs as a pro-poor tool to eradicate poverty, establish good governance, ensure social equity through quality education, healthcare and law enforcement for all, and prepare the country for climate change.

The government has articulated the Digital Bangladesh vision in no uncertain terms, started the process of leadership development to realize this vision and launched a number of initiatives which have demonstrated to policy makers and citizens alike the benefits of utilizing ICTs for service delivery. Moreover, the government has laid the foundation for an enabling environment with an actionable ICT Policy 2009, Right to Information Act 2009 and ICT Act 2009.

This document identifies the sector-specific priorities and the enabling environment that is necessary for Digital Bangladesh implementation. Broadly, the document: (i) analyzes the current overall situation with specific references to relevant initiatives taken so far; (ii) identifies the key success factors behind the progress; (iii) specifies the key challenges and untapped opportunities; and (iv) identifies the strategic priorities by building on successful approaches and initiatives, mobilizing resources and developing partnerships.

The document is targeted to policy makers, development partners, private sector entities, non-government and civil society entities, media, academia and the citizens. The chapters of this document went through extensive national consultation (14 sessions) participated by government and non-government stakeholders and moderated by relevant Secretaries. In addition, there was broad international consultation (for 10 weeks) on the internet in the reputed and well-read forum bytesforall.org where ICT4D experts and practitioners from around the world provided valuable feedback on almost every chapter of the document. The feedback from the national and international consultations was incorporated in the final draft to be presented to the development partners on October 31, 2010 at the Prime Minister's Office with the Hon'ble Finance Minister, Hon'ble Planning Minister, Hon'ble State Minister for ICT and the Principal Secretary.

The document has been prepared by the UNDP-assisted Access to Information (A2I) Programme at the Prime Minister's Office. In identifying the strategic priorities, A2I has been very careful about striking the right balance between equity and growth in the Digital Bangladesh implementation plan. The consultations recognized the danger of adopting western-led approach of building a 'knowledge society' which may contribute to growth but may miss the equity parameter by a large margin. In fact, many participants pointed out that ICTs may lead to further inequity in the form of digital divide. Therefore, it was up to the policy

makers and the implementers to make the right choice. The drafting team always asked whether the common man would benefit from a particular identified priority.

The General Economics Division will incorporate various strategic priorities identified in this document in the 6th Five-year Plan and the Outline Perspective Plan. The Ministry of Science and ICT will revise and update the list of action items in ICT Policy 2009. All service delivery Ministries will develop a plan for implementing the strategic priorities and formulate new projects or incorporate the priorities in ongoing projects.

Digital Bangladesh vision and its implementation offer the country a tremendous opportunity to leapfrog and accelerate its journey to becoming a middle-income country. The detailed plan and implementation of each of the priorities will require collaborative effort from the government, private sector and non-government stakeholders, development partners and the citizens. With global experience and knowledge of good practices, the development partners can guide and assist the process. With resource mobilization, they have the opportunity to expedite the journey.

STRUCTURE OF THE DOCUMENT

In order to implement the Digital Bangladesh vision, the following needs to be addressed:

1. Ensuring a Networked Society which covers issues that are vital to creating a society where organizations and individuals have equitable access to ICT-enabled resources
2. Revitalizing the Key Service Sectors which covers the primary areas of government's service to citizens.
3. Ensuring Strong Support Framework which covers the main areas necessary for creating a stable foundation for Digital Bangladesh.

The document structure reflects the three above-mentioned areas in three sections respectively. Each of these sections is sub-divided into a number of chapters to elaborate on the strategic priorities of Digital Bangladesh.

ENSURING A NETWORKED SOCIETY

Area	**Key Outcomes**
Equitable Access for All	Citizens of the country irrespective of economic condition, education, race, ethnicity, profession, gender are connected through network of mobile communications, broadband Internet, audio-visual media for exchanging information and accessing services.
Vibrant ICT Industry	ICT industry has become the largest employer of educated youth and captured significant share of global outsourcing business.

REVITALIZING THE KEY SERVICE SECTORS

Area	Key Outcomes
21st Century Education	Every student becomes ready to face the challenges of the globalized 221st century world with training from an education system supported by high capacity teachers and an efficient governance mechanism.
Universal Quality Healthcare	The capacity and management strength of the healthcare delivery system ensure that citizens access quality health care services and are adequately prepared for emerging health threats and challenges.
Productive Agriculture	Increased efficiency and equity in the crop, fisheries and livestock sector. Exploitation cause by lack of market information reduced. Different ICT channels for rural finance are enabled.
Just Judiciary	Efficient judicial process where there is no pending cases and justice is not delayed for the citizens, particularly for the poor and marginalized citizens.
Responsive Law Enforcement	Rule of law and secured environment is created, where digitized crime data management covering information on crime patterns, criminal records play an important role in serving citizens and making their life more safe and secure.
Reduced Environmental Vulnerability	The human and natural resources are well protected from natural disasters and climatic changes through a comprehensive and pro-active effort of national and international stakeholders and ICTs are being integrated in that system of protection in an inclusive manner that poor and marginalized communities are not left behind.
Effective and Efficient Social Security	The coverage of social safety-net programmes (SSNP) encompassed the whole marginalized, vulnerable and poor population of the country in a manner that each of them received adequate support to become part of mainstream economic and social activities and by 2021 number of such population reduced to 15% of total population.

Hassle-free Land Management	The reform ensured public access to land records, transparent land transactions and efficient collection of land revenue through modernization of all land records. Socially justified and transparent land revenue imposition and collection system is in place for both the government and citizens. Marginalised citizens established their legal right on khas land through transparent distribution mechanism.
Economic Prosperity	Quality domestic investment and foreign investment has grown up to due conducive regulatory environment and efficient one-stop support.
Indomitable Youth	The youth of Bangladesh, including the disadvantaged groups like women, the extreme poor, and person with disabilities etc. accessed necessary information, skills and education to transform their lives individually and as members of groups and play a pivotal role in nation-building.

ENSURING STRONG SUPPORT NETWORK

Area	**Key Outcomes**
Policy & Legal Framework	Policies and laws affecting sectors are reformed and new policies and laws are enacted for a thriving knowledge-based society.
Self-governed and Responsive Local Government	A connected system of local government institutions across the country is on the ground for efficient governance and effective information and service delivery to the citizens through enhanced transparency and citizens' participation.
Pro-citizen Civil Service	Bangladesh civil service transformed into a dynamic and responsive administration which makes informed and efficient governance decisions and delivers services to citizens' doorsteps with minimal cost, time and hassle to the citizens.
Inclusive Banking and Access to Finance	ICT-oriented legal and regulatory reform enables all citizens to access banking and financial services where KYC procedures are not a barrier to access to finance.
Service Delivery-Focused PPP	All strategic priorities are converted into e-service delivery and ICT projects and implemented under PPP framework.

1. ENSURING A NETWORKED SOCIETY

1.I. EQUITABLE ACCESS FOR ALL

KEY PROBLEMS	• Despite phenomenal growth in mobile phone subscription a significant part of marginalized community, particularly women, is out of the reach of mobile phone network due to affordability • While mobile growth creates opportunity for common citizens, access to high speed Internet connectivity is still very limited due to high cost and lack of last mile connectivity as it is not commercially viable • Inadequacy of useful local language content and useful services through public access ICT venues or mobile phone limits scope of changing lives • Mobile phone based value added services benefiting citizens' income and empowerment are limited for a number of reasons, particularly unattractive revenue sharing policy • There a lack of synergy between private sector and not-for-profit sector player and the government in making public access ICT venues financially and socially viable.
VISION	To build a connected nation with high speed broadband Internet connection with last mile access which enables a connected citizenship.
OUTCOME	Citizens of the country irrespective of economic condition, education, race, ethnicity, profession, gender are connected through network of mobile communications, broadband Internet, audio-visual media for exchanging information and accessing services.

STRATEGIC PRIORITIES

DOMESTIC AND INTERNATIONAL CONNECTIVITY

- Government will expedite the process of having second and even third submarine cable connection to ensure redundancy and reliability in nationwide Internet connectivity.
- The government will take initiative to reduce price of bandwidth which will facilitate increasing number of net users, enhancing demand for local content and applications, and a stronger boost towards developing a connected Bangladesh.
- The Rural Telecommunications Network Development and Utilization Guideline 2010 drafted by the 'domestic network coordination committee' with BTRC as secretariat will be implemented to make sure that the existing network infrastructures have been optimally utilized for commercial communication and key social services (e.g. education, health care, e-governance, etc.).

TELECOMMUNICATION SERVICES

- The government will revisit taxation policy for mobile telecommunications industry for creating opportunity for the reaching out poor population in rural Bangladesh. Such decision will attract more investment by the telecommunications operators.
- The government will accelerate the process of introduction of new technology (e.g., 3G, 4G, LTE) in the mobile telecom segment through transparent licensing system.

ACCESS TO BROADBAND

- Nationwide a national information infrastructure plan will be developed.
- The government will initiate programme for resource mobilization so that every citizen will have effective access to information and service through various channels.
- The government will develop appropriate incentives for value added service providers through mobile telecommunications and Internet through regulatory arrangement and other mechanisms so that innovative solutions can come and the providers can protect their investment.
- The government will promote public private partnership for launching various e-services, particularly those, which are targeting rural and marginalized population in the area of health, education, employment creation and human rights.

LAST MILE CONNECTIVITY

- The Government will invite private sector and not-for-profit sector for rolling out broadband connectivity in rural area. Basically it might be government-private-NGO partnership for reaching the very last mile, where there is already vibrant NGO presence. Here, local entrepreneurs will be encouraged to launch last mile Internet service to local community.

CONTENT DEVELOPMENT AND SERVICES

- Synergistic opportunities will be explored between diverse communication media (e.g. FM Radio, Satellite TV, Cellular Phone services, etc.) to reach out to maximum number of people at a shortest possible time with valuable information.
- Community Radio (CR) can emerge as another channel of LMC for the BoP population.

INTRODUCTION

With 45.3% functional literacy rate (BANBEIS, 2010) and majority of the population based in rural areas, the people of Bangladesh predominantly rely on traditional and relatively low-tech ICT options to have access to information. The size of user base for public AM radio and terrestrial TV in Bangladesh is comparable to its South Asian neighbors (except Nepal, which enjoys an exceptionally high radio listenership rate). Figure 1 shows the comparative data for literacy, telephone and internet density and other traditional access among four South Asian countries.

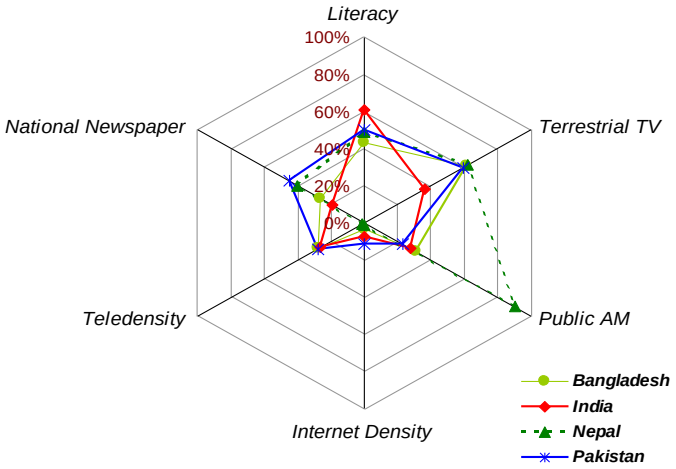

FIGURE 1

In the ICT Development Index released by the International Telecommunication Union (ITU), Bangladesh is ranked is still not encouraging yet. Out of 154 countries, rank of Bangladesh is 138, only above Nepal (ITU, 2010). On the other hand, public access to ICTs with and without Internet connectivity during last one decade (2001-2010) mainly through private and not-profit initiative played an important role in reducing digital divide, although it was not adequate proportionate to the needs.

Our constitution envisions a state mechanism that guarantees equitable distribution of wealth among its citizens and of opportunities, which will eventually guide to the path of sustainable economic development. Use of Information and Communication Technology (ICT) for connecting the millions and developing optimized resource utilization framework can help us as a nation to attain this constitutional objective. The “Charter for Change” pointed to the need for human resource development using ICT (in communication and education), a key factor for the establishment of an equity based society, the “Digital Bangladesh”. The national ICT policy 2009 also reflects this overarching goal of development using ICT. This policy recognizes social equity, universal access, and support to ICT options as some of its key strategic objectives. Moreover, a set of “ICT for development” targets fixed by the World Summit on Information Society (WSIS) for building an inclusive information society was endorsed by Bangladesh (WTDR, 2010). Overall, the primary precondition for an equitable knowledge society is to ensure the development of an affordable and convenient multi-channel access mechanism for citizens and promote digital inclusion for development.

VISION

The vision for an inclusive society is that all citizens are able to participate in creation of wealth and its equitable distribution, where information and reliable and affordable communication technology channels are available for accessing information for making informed decisions and accessing services at their doorsteps. Such an inclusive society also creates digital opportunities for common citizens to participate in governance.

OUTCOME STATEMENT

Citizens of the country irrespective of economic condition, education, race, ethnicity, profession, gender are connected through network of mobile communications, broadband Internet, audio-visual media for exchanging information and accessing services.

SITUATION ANALYSIS

DOMESTIC AND INTERNATIONAL CONNECTIVITY

Bangladesh has countrywide telecom backbone network; both optical fiber and wireless. The mobile operators, Bangladesh Telecommunications Company Limited (BTCL), Power Grid Company of Bangladesh (PGCB), Bangladesh Railway (BR), some PSTN operators and new entrant Nationwide Telecommunication Transmission Network (NTTN) operators are the key players in developing backbone infrastructure in the country. All but the PSTN operators cumulatively have deployed almost 15,000 km optical fiber backbone covering 59 districts. Total 297 upazillas are covered by this fiber network. Due to topographical reason, the Chittagong Hill Tract and a couple of other districts in the Southern part of the country are outside the present fiber optic network infrastructure. Under 'build, operate and own' arrangement, the NTTN operators have been given the right to develop, maintain and operate NTTN to become nationwide infrastructure developer. (BTRC, 2010)

In addition, BTCL, most of the mobile operators and some of the ISPs have microwave (wireless) backbone throughout the country. The two wireless broadband (WiMAX) operators are also rolling out their backbone or share network infrastructure from other operators. To avoid the unnecessary duplication in developing fiber backbone and other telecom infrastructure and setting up a cost effective system, the telecom regulator has issued 'Infrastructure Sharing Guidelines.' The operators already have started sharing their passive infrastructure and leasing out spare backbone capacity to other operators which have created a positive impact in the sector (BTRC, 2010). The state owned operator and NTTN operator are in the deployment of more optical fiber links in different routes. Most of these will provide redundant backbone connectivity for the operators.

The government of Bangladesh is proactive in expanding the information backbone all over the country. To coordinate the optical fiber deployment in the country, 'Domestic Network Coordination Committee' has been formed from the initiative of the Prime Minister's office

(PMO). Optical fiber network utilization policy has been drafted. The committee is also coordinating the stock taking of the necessary fiber backbone links and capacity to make the internet connectivity available to the information centers and e-centers established and to be established at upazila and Union level. In Figure 2, we can see an overview of all the fiber optic networks within Bangladesh. (BTRC, 2010)

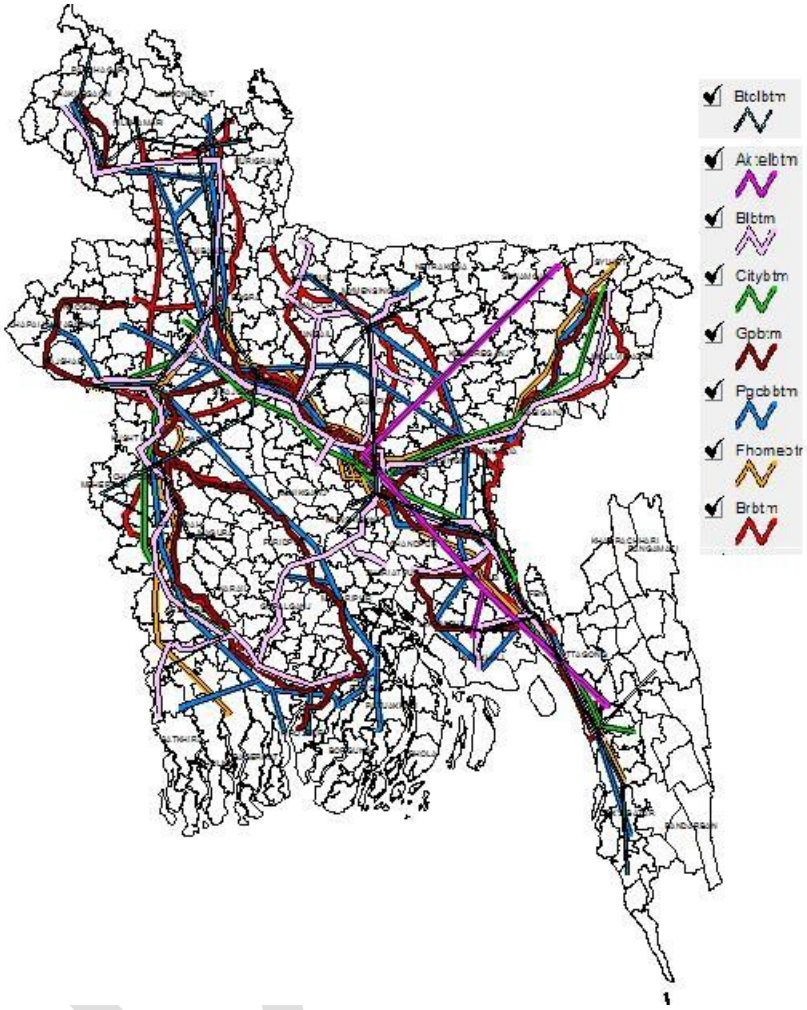

FIGURE 2

In addition to the state-owned SEA-ME-WE-4 undersea cable, the government is planning to award second submarine cable license to private sector (BTRC, 2010). The final draft of the licensing guidelines has been published for public comments. To expedite the establishment of redundant international connectivity, government also has a plan to award International Terrestrial Cable operator license to private sector. With the successful implementation of these systems, Bangladesh can have fast and diversified international connectivity through neighboring countries.

TELECOMMUNICATION SERVICE

Mobile Phone: In Bangladesh, the access price for mobile telephony and the monthly tariff is one of the lowest (ITU ICT Index-2009, Samarajiva, 2008). At present there are approximately 63 million cellular phone subscribers (BTRC, August 2010). Overall, the tele-density (voice) is steadily rising over 34% in terms of active connection availability. But as traditionally our rural population uses shared access to the mobile phone services, the access rate is higher than the Customer Premise Equipment or CPE (active connection) penetration. With the opening up of mobile services in the Chittagong Hill Tracts area, mobile phone coverage has already reached more than 90% coverage in terms of geographical area and 98% in terms of population coverage. Through individual ownership, shared access, public call centers and phone-ladies, cellular phone has become the most popular ICT option in Bangladesh.

Now the Government is preparing to award 3G license to the mobile operators. The licensing guidelines have been drafted. Also the 2G license of the four mobile operators are going to be renewed by 2011. The regulatory body is working on the license renewal issues and Mobile Number Portability, Emergency call service etc are being considered in this case. Also the dialogue is going on in the industry that whether the 3G frequency should be awarded through 'Open Auction' or 'Beauty Contest' and also about the possibility of a new entrant in the 3G awarding process.

Fixed Phone: For the fixed land line, total subscriber is 1.03 million (BTRC, May 2010). For a long time, the fixed voice service has been a state monopoly and that system totally failed to create a mass subscriber base and failed to promote telecom as a service to the people. Then after, the regulator, especially from the year 2004, started the awarding of fixed voice licenses to the private operators. But due to the absence of proper business model and attractive service offerings, the subscriber base has not been expanded to the expected level.

IP Telephony: To legalize the use of VOIP call services in the local market, the regulator has started the licensing of IP telephony service to the ISPs. Till now, 34 licenses have been awarded. The IP-IP domestic calls probably will get popularity, especially among the corporate customers as the IP Telephony operators are allowed to offer free IP-IP domestic calls for their customers. The bundle offer of unlimited IP-IP calls for a fixed internet connection charge will attract the users and the penetration of fixed internet is supposed to be increased.
Beside the retail customer service, the Mobile and PSTN operators are offering PCO services. For the small entrepreneurs, this PCO business has created a widespread impact on the local market.

Access to Broadband: Bangladesh has one of the lowest Internet penetration rates in South Asia (4.08%) (BTRC, 2010). Its neighbors, Pakistan, India and Nepal have Internet penetration of 11.1%, 7.2% and 1.4% respectively (Figure 1). The majority, approximately 5 million users are accessing Internet using GPRS/EDGE technology (provided by cellular phone companies). The number of fixed line Internet subscribers, connected to the PSTN and ISPs is around 0.4 million (Telenor, 2010). In addition, the government is actively promoting the concept of shared

Internet usage through community information centers or telecenters. The ratio between mobile Internet users and the fixed Internet users has been given in Figure 3 (Telenor, 2010).

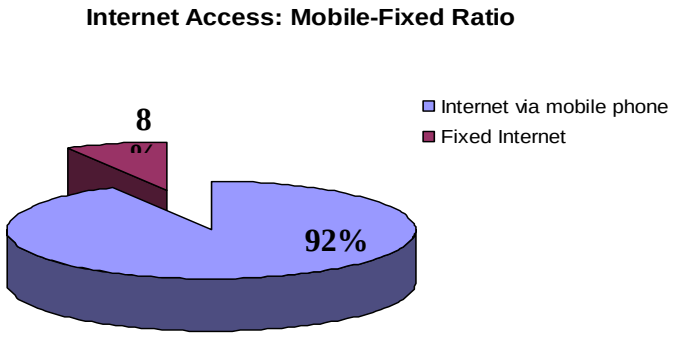

FIGURE 3

At present, there are 101 national and 138 zonal ISP license holders for providing Internet services in Bangladesh. The PSTN and CDMA mobile operators are using EVDO technology for providing data service. Some of the ISPs are also provided with frequency bands to provide fixed wireless data service (BTRC, 2010). Two WiMAX operators have started their service in Dhaka and other parts of the country. For a number of times, the regulator has reviewed the international and domestic bandwidth price, especially for the data service. The license fee and relevant charges has been reduced drastically for the zonal ISPs to promote fixed line internet penetration to the marginal areas. Now, the NTTN operator is also deploying FTTx lines, which will help the subscriber providing bundle of telecom, broadcasting and IT services through the same connection (BTRC, 2010).

Broadband for development: The most popular way to access the internet service is mobile phone as the access price to this type of data service is comparatively very low, offers high user flexibility and it is less prone to any power related problems. Considering all these factors, in order to expedite the broadband penetration, 3G frequency is considered to be awarded to the cellular operator. According to the experts around the world, the governments and the private sectors of emerging economies should consider a timely, universal, and affordable access to broadband as an essential consideration (Dutta, 2010). A 2009 study found that a 10% higher broadband penetration in any particular year is correlated with 1.5% greater labor productivity growth over the following five years. According to a World Bank study, in developing countries, every 20% increase in broadband penetration can increase the GDP growth by additional 1.38%, which is higher than any other telecommunication services (see Figure 4). (Broadband Commission, 2010).

ROLE OF BROADBAND FOR ECONOMIC GROWTH

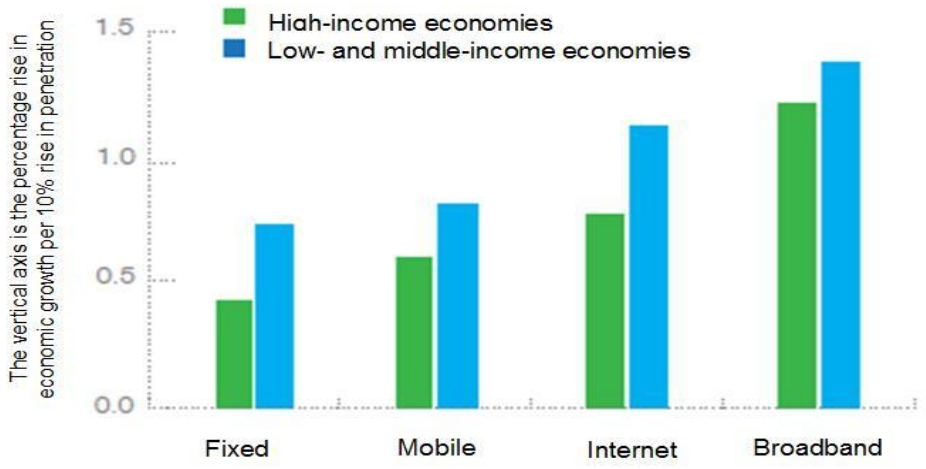

FIGURE 4

A joint study done by Boston Consulting Group and Grameen Phone shows the overall contribution in GDP can be accrued up to 2.6% per annum in 2020, due to the significant economic benefits projected from high speed Internet in Bangladesh. In addition, the Internet has the potential to create 42,000 new businesses and add 129,000 new jobs by 2020 (see Figure 5.1 and 5.2). (Telenor, 2010)

Projected Economic Benefits by 2020

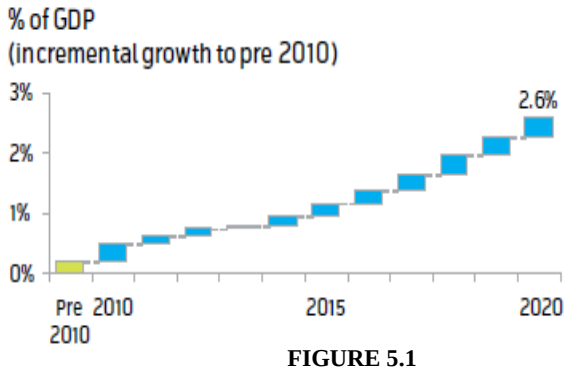

FIGURE 5.1

2.6% GDP CONTRIBUTION

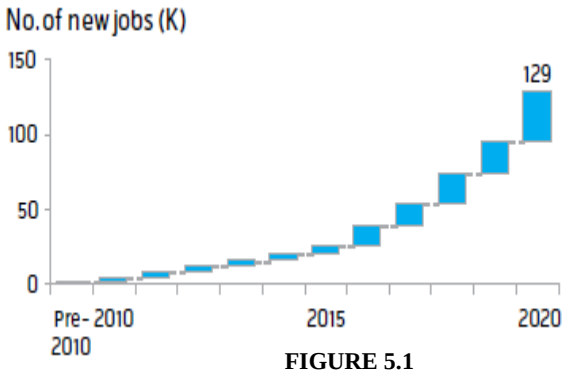

FIGURE 5.1

129,000 NEW JOBS

High access price for Net usage is one of the key challenges that should be addressed in order to make Internet a major development tool for the base of the pyramid population. Study shows accessing Internet in Bangladesh is twice as costly as it is in India or Pakistan, relative to the average income of our population (see figure 5.1). (Telenor, 2010)

High Access Price, relative to Income **Awareness below 50%**

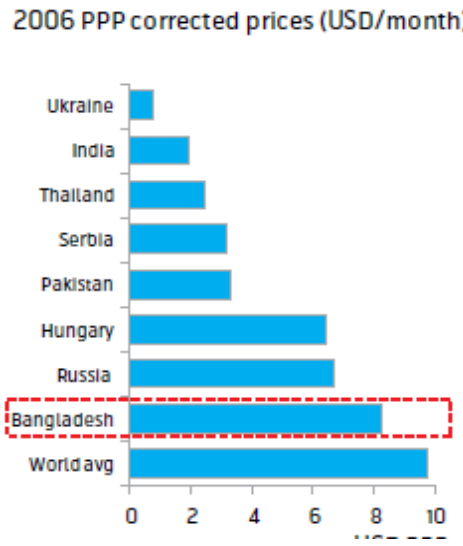

FIGURE 6.1

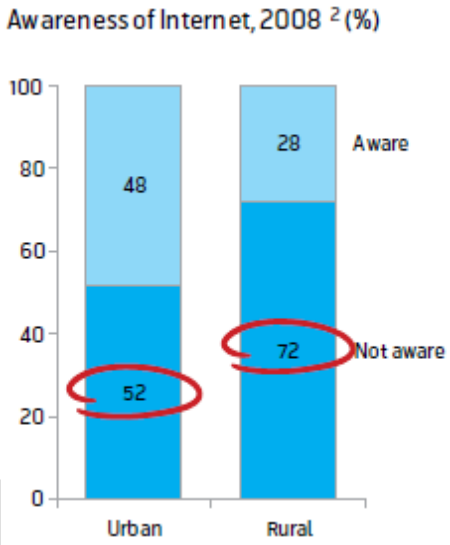

FIGURE 6.2

There is also lower level of awareness about the Internet and the benefits it can offer. Study shows, less than 50% of the population (urban or rural) is aware about Internet in Bangladesh (see Figure 6.2). (Telenor, 2010)

Inadequacy of localized content (using local or English language) is another major challenge in making Internet a popular medium. Due to low functional literacy and lack of proficiency in English, the majority of Bangladeshis are missing out from accessing the global knowledge networks via Internet.

LAST MILE CONNECTIVITY

The government recognizes the importance of a strong public-private partnership to develop a sustainable network of last mile connectivity (LMC). Community based telecenters or rural shared Internet access points are being developed as parts of the LMC infrastructure by private sector, not-for-profits and the government. Rural people have started to reap the benefit of modern ICT based applications through these telecentres. Through the intermediaries they can call a help line or have access to a website for their query.

Local Government Division has set up Union Parishad Information and Service Centers (UISC- a shared access point setup under public-private partnership) at all 4,498 unions with computers and Internet connections, which are expected to be launched in November 2011. Initially, 100 UISCs were setup in 2009. In addition, government can explore the possibilities of using installations like Community Health Clinics (approximately 18,000 all over Bangladesh) as last mile information access points for the local communities. A2I project is facilitating the setup of information centers at all the Unions with broadband internet connectivity. LGRD ministry is implementing a project to provide data service to the rural people through training up 2 personnel from each Union and hosting service centre by them.

Presently, more than 2300 telecenters and 500 Community Information Centers (set by mobile operators) are in operation all over Bangladesh. Telecenters or rural information centers provide a range of services with high variance (e.g. net connectivity for the community population, ICT training, agro-based information service, photocopy service, digital photography, printing out government forms, telemedicine, courier service etc) (BTN, 2010)

The postal service in Bangladesh reaches citizens in remote corners where private courier and telephony services are not available. Wide-range network (10,000 post offices) and affordability are the primary characteristics of public postal services in Bangladesh. The post offices all over the country can be used effectively in delivering information and services to the rural citizens and thus reducing the digital divide. In alignment with the 'Digital Bangladesh' vision, Bangladesh Post Office (BPO) has initiated a few e-services and strengthened their capacity to deliver digitized services. In 2009, the Postal department initiated computer-based vehicle tax collection in 60 post offices. A number of private banks already signed agreements with BPO to use their network of post offices around the country to transfer remittances to the doorsteps of the beneficiaries. The rural people will be able to receive instant cash payment from designated post offices. BPO has also signed agreements with Western Union Money Transfer to transfer foreign remittances to the grassroots people through post offices. In terms of domestic money transfer, the recently inaugurated mobile money order and postal cash card service have made remittances to the rural area even easier. In this system, all post masters will be given special SIM cards and anybody with a mobile phone can send/receive remittance through the post office.

Education ministry is working in 128 upazila to build ICT infrastructure for facilitating ICT services. Bangladesh Computer Council is providing internet connectivity (through EDGE Modem) to 1200 schools. The PMO is taking initiative to coordinate all these efforts and has targeted to connect all the Unions with broadband internet connectivity and ICT service within 2-3 years. The development of shared access point at different level is also important in a resource-constrained environment. However, special emphasis must be put on ensuring that women have equitable access to these shared points by ensuring a gender-sensitive environment.

Scarcity of power/energy sources, required for the functional effectiveness of LMC installations and information access points, specifically in rural and semi-urban areas is a major barrier for effective functioning of all public access ICT venues. The ISPs, though are enjoying very low regulatory charges and relevant fees, also are not interested to go to the rural areas because of the absence of demand, high infrastructure development cost and operational cost.

Absence of effective financial and participation models has left many of the telecenters and similar information access points struggling. Active participation from the base of the pyramid population is also absent in many places. New services need to be added for making them flourishing, where the government agencies can play an important role.

CONTENT DEVELOPMENT AND SERVICES

The non-for-profit entity D.Net was the pioneer in creating a trend of developing Bangla language digital content targeting rural population, which started creating Bangla content in 2003. Subsequently, private sector entities and government institutions came forward and developing digital content in various forms. UNDP played an important role in promoting local language livelihood content development. In e-content and ICT for Development Award 2010 submission of 93 nominations is a manifestation that content initiatives are thriving.

With growing user base in cellular phone and Internet sectors, service providers are introducing value added services, which commercially as well as socially viable. Mobile based health and educational help-line options are fast becoming popular among millions in both rural and urban settings. Mobile based functional English learning service (BBC Janala) has been launched with interactive teaching options. Private entities are also actively exploring synergistic opportunities between mobile telephony, Internet and infomediaries (field workers with focus on information services). Especially in rural areas, more people are showing willingness to use agriculture and health centric information services. Phone-in options and "Short Message Service" or SMS are now widely used by mainstream TV and radio stations to obtain viewers'/listeners' opinion on a wide variety of issues. All mobile phone service providers are providing consultation service with doctors. Both live consultations with doctors and Interactive Voice Response (IVR) services are being offered to the people. The upazila Health Complexes are equipped with mobile phones where people can consult with the doctor on-duty.

As mentioned in the previous sections, the government alongside the private sector has also recognized that despite all the developments demand for local content is still very high. Text and multimedia livelihood contents (created by some private, not-for-profit entrepreneurs and Access to Information project of the PMO) cover key areas like agriculture, health and human rights. At the same time, initiatives taken by "Agricultural Information Services" and agencies under the Ministry of Health to create digital content are set to address the present gap. Initiatives are also in place to develop digital contents for people with disabilities. Audio books and software for the visually impaired people (in both Bengali and English) are also being used for the population without functional literacy. Young Power for Social Action (YPSA), a Chittagong based NGO is the leading institution in this domain.

In addition to the information centers, a large user base of TV and radio services can also be utilized for information dissemination. But the social and educational value addition of the present service system is extremely low. Though every family in a village cannot afford their own TVs, watching TV programs collectively in an affluent house has always been a common practice in the villages and towns in Bangladesh. In terms of radio broadcasting, the private radio channels are not accessible to the whole country; especially rural communities. Popularity of these urban FM radio stations are on the rise, especially among the youth. The public radio, "Bangladesh Betar" has the largest network which covers the whole country. It broadcasts programs on diverse issues e.g. health and nutrition, education, children and women rights.

The government issued license to 15 institutions to launch Community Radio (CR) in the country to reach various communities in the country and deliver information and services tailored to the respective community with their active participation. Community Radio (CR) reaches the mass population and yet serves the particular needs of different communities. It is established and/or operated by a particular community and broadcasts news, information, programs tailored to the respective community's condition and needs.

Although there is a huge scope for growing value-added service market in the country, however, absence of proper regulatory regime does not allow growth in the sector. The current portfolio of VAS does not go beyond entertainment. The efforts for making ongoing connectivity and public access system disability sensitive are not adequate.

Key Strengths and Opportunities	Key Challenges and Risks
• Huge private sector interest in mobile telecommunications and Internet connectivity for investment • Significant government participation in creating public access ICT venues (Upazilla Information Centre, UISC etc.) • Efforts are on in creating online services for accessing by the citizens in telecentres, particularly in UISCs • Potential untapped market at the bottom of the pyramid for connectivity, content and services • Potential for enhancing growth in mobile telecom market through reform in taxation • Vibrant content development initiatives both in private sector and non-for-profit sectors	• The international gateways are not allowed to set commercial negotiation with the foreign carriers to set the international bandwidth price to a reduced level • BSCCL has no long term plan on decreasing the bandwidth price or in utilizing the rest of the bandwidth (20 Gigabit) for domestic applications • Lack of interest among the private sector to provide last mile Internet connectivity due to poor demand • Inadequacy of localized content and services makes public access ICT facilities suffer from low effectiveness. • Absence of proper regulatory regime for promoting value added service providers • Inadequate efforts in making ICT facilities and content accessible to print disable communities • Lack of synergy between private sector and not-for-profit sector player and the government in making public access ICT venues financially viable.

STRATEGIC PRIORITIES

DOMESTIC AND INTERNATIONAL CONNECTIVITY

As already under active consideration, the government will expedite the process of having second and even third submarine cable connection to ensure redundancy and reliability in nationwide Internet connectivity.

Lower price and equal access for competing service providers can help to ease the gap of access to information faster. The open Cable landing Station (CLS) policy will be adopted. Efforts towards eliminating scope for monopoly and unfair business practices will be taken at each stage of the domestic and international connectivity. The MOPT and BTRC will take necessary steps to lower price of bandwidth for increasing number of net users, raising demand for local content and applications.

The Rural Telecommunications Network Development and Utilization Guideline 2010 drafted by the 'Domestic Network Coordination Committee' with BTRC as Secretariat will be implemented to make sure that the existing network infrastructures have been optimally utilized for commercial communication and key social services (e.g. education, health care, e-governance, etc.). Lower price of bandwidth and efficient usage of the existing networks will help Bangladesh to increase the Net user base, one of the key conditions to improve its IDI Access ranking.

TELECOMMUNICATION SERVICES

The government will revisit taxation policy for mobile telecommunications industry for creating opportunity for the reaching out poor population in rural Bangladesh. Such decision will attract more investment by the telecommunications operators. The government will consider economic means of curbing illegal VoIP instead of applying law enforcement measures. The government will accelerate the process of introduction of new technology (e.g., 3G, 4G, and LTE) in the mobile telecom segment through transparent licensing system.

In the last revision of National Frequency Allocation Plan, frequency bands have been reserved for Long Term Evolution (LTE)[1] and Digital Dividend[2] (Multimedia Broadcasting). Considering the technical development, interoperability and ability to offer ubiquitous services, these technologies are considered to be having great prospect in our country, and the government will initiate the transition process towards adopting these technologies.

[1] LTE is a step toward the 4th generation (4G) of radio technologies designed to increase the capacity and speed of mobile telephone networks. (ITU,2010)

[2] The unprecedented amount of spectrum that will be freed up in the switchover from analogue to digital terrestrial TV is known as the Digital Dividend. (ITU, 2010)

ACCESS TO BROADBAND

Already Bangladesh has achieved almost 100% coverage in terms of mobile telephony and mobile-based Internet services. However, a large segment of population is still outside of the network connectivity. The government will initiate programme for resource mobilization so that every citizen will have effective access to information and service through various channels.

The government will develop appropriate incentives for value added service providers through mobile telecommunications and Internet through regulatory arrangement and other mechanisms so that innovative solutions can come and the providers can protect their investment. The government will promote public private partnership for launching various e-services, particularly those, which are targeting rural and marginalized population in the area of health, education, employment creation and human rights.

In order to accommodate the growing number of IP enabled devices, the government will initiate the migration from Internet Protocol version 4 (IPv4) to IPv6 which uses 128-bit addresses, enough to facilitate the ever expanding Net based gadgets, services, and networks all over Bangladesh. Moreover it will help in the proliferation of broadband access at the base of the pyramid level and a better performance of our country in the IDI Use comparison globally.

LAST MILE CONNECTIVITY

The government will promote through appropriate incentive a mechanism for LMC applications using alternative energy and low power solutions should be encouraged. The Government will invite private sector and not-for-profit sector for rolling out broadband connectivity in rural area. Basically it might be government-private-NGO partnership for reaching the very last mile, where there is already vibrant NGO presence. Here, local entrepreneurs will be encouraged to launch last mile Internet service to local community. High speed and reliable connectivity at micro level will enable environment for better learning, thus paving the way to improve Bangladesh's ranking in IDI Skills index.

CONTENT DEVELOPMENT AND SERVICES

The government will focus on providing integrated multimedia broadcasting service to reach the marginal sections of the country. Synergistic opportunities will be explored between diverse communication media (e.g. FM Radio, Satellite TV, Cellular Phone services, etc.) to reach out to maximum number of people at a shortest possible time with valuable information.

Community Radio (CR) can emerge as another channel of LMC for the BoP population. If people's participation is ensured, CR can be a sustainable LMC platform for people-to-people, two-way communication and problem solving. The government has already granted 15 licenses

towards achieving this goal. The government will provide support to the initiators of community radio for content generation and operation at the initial stage.

The government will invite private and not-for-profit entity to work with various agencies for developing relevant content solutions for citizens in general and particularly marginalized community including women, children and disable population. All the government websites will be accessible for the people with disabilities.

PARTNERSHIP STRATEGY

For connecting all citizens and providing opportunities to access information and services there is no alternative to collaborative arrangements with private sector, NGOs and international development partners. For last mile connectivity and content and service delivery development partners' role will be critical along with the stewardship of the government agencies. In ensuring marginalized population accessing information and services and public access ICT venues function effectively, not-for-profit entities have a very important role.

INDICATORS MEASURING PROGRESS

- Tele-density and tele-access
- Broadband access rate
- ITU's ICT development indexes
- Affordability index for telephone, Internet and content and services
- Share of marginalied population having access to information and services through public access ICT venues.

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1.ii. VIBRANT ICT INDUTSRY

KEY PROBLEMS	• Though a significant number of educated and qualified entrepreneurs have started ICT ventures during last couple of decades, most of ICT enterprises (except for hardware companies) in the country are stuck in the 'small size-low growth' situation because various reasons including fund constraint for growth investment, unfavorable market situation and lack of required resources. • IT companies (mainly the software and ITES) have very limited access to institutional financing, both for working capital as well as project financing. Banking and financial institutions are not ready to understand the nature of knowledge industry and their products, services and attitude are not knowledge-industry friendly), not enough market size etc. • There is severe gap in both quantity and quality as far as the human resource for software industry is concerned due to institutional deficiency of the tertiary ICT-related educational institutions (lack of industry orientation of teaching resources, slowness of curriculum modernization etc.) as well as inadequate quality input from the higher secondary education system in to the tertiary level. Most companies face the problem of retaining their trained professionals because of high turnover (mainly for migration to other developed countries). Technical and vocational training (TVET) infrastructure is also not producing industry ready ITES workers. • Size of domestic market is small due to limited government procurement. Private corporate business segment has also not yet reached significant level to generate enough cash flow for the total number of IT enterprises. Also the predominant business model is still very much one-off 'client-vendor' model, not long term solution provider model. Hence the IT companies cash flow are often erratic and cyclical, not favoring long term strategic growth planning. • High cost of bandwidth deters growth of domestic market for ITES. • Most of the companies face difficulty in mid and top level management leadership position that would drive the company growth. • Absences of IT Park/Software Technology Park, high internet cost, no redundant submarine cable, power shortage are some of the common infrastructural problems for most of the IT enterprises. • Growth of export of ICT industry is below the expected levels due to inadequacy in entrepreneurial dynamism, limited overseas marketing budget and absence of government level initiatives in promoting country brand • Policies and facilities are not friendly for value added services providers in the mobile phone industry.
VISION	To unleash potential of youth talents and create good quality employment for them in the IT sector through cluster of innovation driven entrepreneurial initiatives.

OUTCOME	ICT industry has become the largest employer of educated youth and captured significant share of global outsourcing business.
STRATEGIC PRIORITIES	• The government in collaboration with development partners will build High-tech Park with complete facilities (facilities for employees, schools, medical support, recreation facilities etc.) for attracting foreign investment in the sector. Public-private partnership will also be considered as an option for such arrangements. • Bangladesh Bank and Ministry of Finance will undertake specialized programme for enabling banking and financial institutions provide access to finance to ICT industry by building capacity of mid-level and top level bank officials and show the potential of ICT sector for financing and providing know-how on how to finance with risk mitigation. The programme will also include support to banking and financial institutions to launch special working capital and long term project funding. • Special provisions for IPO/Stock market listing (e.g. low level of mandatory paid up capital) will be explored for IT enterprises so that these companies can raise required capital from share market. • All ministries and various government agencies will identify projects where ICTs can be mainstreamed as well as projects related to building ICT infrastructure for implementation where Bangladeshi companies will be given preference and in case of joint venture initiatives the stake of local companies will be at least 51%. • All ministries will prepare projects to be implemented under public private partnership (PPP) framework, where private sector will provide services to the citizens and business on behalf of the government with a sustainable business model linked with domestic and foreign direct investment. A series of programs through Office of the PPP at the Prime Minister's Office will be organized which will include road show on PPP for attracting projects under the PPP modalities. • The Ministry of Commerce/ Ministry of Science and ICT in collaboration with all ICT-related business associations will develop a 10-year master plan for promoting country brand including specific actions related to inclusion of Bangladesh in globally reputed outsourcing/off-shoring index/ranking list. • For addressing the problem of human resource, a long term plan will be undertaken so that current supply of 5,000 yearly IT graduates can be increased to 10,000 in next 2/3 years. Students from non metropolitan cities with relatively low overseas migration trends (colleges under national Universities must start IT education) will be encouraged to enroll. Also, special education loan policy and scholarship will be developed to encourage students for IT education enrollment. More industry involvement will be ensured during academic programmes. The current declining trend of Science enrollment at secondary and higher secondary level will be reversed by awareness creation.

INTRODUCTION

The ICT industry has had a steady growth since the last decade. Currently, there are over 500 registered Software and IT Enabled Service companies in Bangladesh. The country has over 10,000 registered and unregistered Hardware Vendors and 1,000 registered vendors in Dhaka City. However, there is significant scope for improvement. Since a vibrant ICT industry forms a critical component of the backbone for the vision of Digital Bangladesh, the government has put special emphasis on this sector.

VISION

The potential impact of a vibrant ICT industry is multifarious: 1) It can become one of the largest employers of graduates in the country; 2) It can drive innovation for IT-based services in the government and the private sector; 3) An export oriented sector can earn valuable foreign currency and also retain talent within the country. The overall vision of the government is to make the ICT industries live up to these potentials.

OUTCOME STATEMENT

ICT industry has become the largest employer of educated youth and captured significant share of global outsourcing business.

SITUATION ANALYSIS

SOFTWARE & ITES INDUSTRY

More than two third of the software and ITES companies in Bangladesh are serving the domestic market. There are few companies (less than 50) who focus on local as well as export market and around 100 companies are entirely export oriented.

DOMESTIC SOFTWARE/ SOLUTION MARKET

This market is also dominated by custom application development. Industry specific matured products are few (e.g. some banking applications, ERP for garments and some general Accounting software products). Also, a significant number of local companies are doing implementation and customization of foreign products and applications in banking and other domains.

In terms of employment, the software sector currently employs around 8,000 to 10,000 people. Not more than 10 companies have more than 100 employees, 200 being the highest number of employee in a company. The ITES sector employees around 15,000 people. Employment ranges from small to 1,000 (mainly in data entry set-up). The employee size is 50-150 people per company in the very small number of successful GDS companies that are currently operational in Bangladesh. The turnover rate of the industry (both software and ITES) is very high – over

20%. For software, the turnover is mainly due to migration to developed countries as well as the wide range of salary and other benefits that exists within the country. For ITES, the turnover is higher because of movement from company to company within the same industry owing to an acute shortage of skilled professionals.

In recent years, a very strong trend of freelancing has emerged where a lot of young professionals are serving overseas clients. These people do not own registered enterprises, they mainly work from home.

SOFTWARE EXPORT

Major Export markets for software companies include USA, Japan, UK, Denmark, Sweden, Norway, Netherlands, Germany, Australia, Saudi Arabia and UAE. Typical size of software companies are 10-30 persons. A handful companies (around 10) employ over 100 persons. Most of the software exporting companies are mainly involved in development and maintenance of small to midsized web applications, games or mobile applications etc. These companies can be grouped into three categories. There are some companies who work as direct ODC (offshore development centre) for an overseas IT company. These mainly provide coding/testing service with very little involvement in application design. Typically the revenue per employee is on a lower side - approximately US$ 10,000 per year.

Another type is general software development service providers working on relatively mid level of technology/domain knowledge expertise and serving clients of different countries of different nature. Revenue per employee is also not very high in this group. Majority of the software companies in Bangladesh fall into the second category. The third group is 'Boutique' type of software companies which work on specific domain areas and work on very advanced technologies. These companies are not very large in size; they employ high-skilled and talented people and are generally highly profitable. Typically, the revenue per employee for such firms is over US$ 20,000 per year.

With regard to product based export companies, there are only a few cases of world class software products branded at a global level (e.g. VoIP dialer product of Reves Systems). Very few companies produce large enterprise applications or high end embedded applications (with the exception of chip design of Power IC). Export volume per annum is around US 30 Million (as per BB/EPB source; industry source –US$ 50 Million). Most of the companies that are focused in exports are very small size (typically 20-50). There are only a handful of companies employing more than 100 persons (e.g. BJIT).

ITES EXPORT

It is widely believed that readiness of Bangladesh for IT export is more pertinent for IT Enabled Services (ITES) than for software exports. The required skill level for exporting ITES is generally lower in some ITES areas such as graphics, engineering drawing, customer support, accounting etc. Also, this sector has more scope for employment creation; although the salary of one ITES

employee is almost one third of that of a software employee, the absolute numbers of jobs that are being created in ITES sector are higher than software export companies.

During recent years, there has been a number of successful cases of export oriented Graphic Design Services (GDS)). At least 10 joint ventures and/or fully owned foreign subsidiaries in GDS are fully operational in Bangladesh. A number of them are working as back-end factories for image processing, Desktop Publishing (DTP) etc. for large global clients like Dell, Rolex, Yahoo, Kodak and so on. There have been high investments in animation and gaming but achievement is limited so far. There are now a few successes in the fields of CAD (Computer Aided Design), engineering/architectural drawing conversion/vectorization, and accounting back office.

DOMESTIC HARDWARE MARKET

Every year, over 300,000 PCs are imported. A large portion of those PCs are assembled locally (the local value addition is less than 15%). There is hardly any part of a PC that is manufactured locally. Large organizations including financial institutes and Telecom companies also import a large number of servers for supporting their solutions and data centres. The structure of the PC/Server market is heavily controlled by the few importers where there are less than 10 large importers who import bulk of these items. The retail market, on the other hand, is very fragmented with thousands of small entrepreneurs with small retail outlets (these also work as maintenance set ups) all over the country (in Dhaka alone there are over 2,000 such outlets). There is a strong supply chain structure across importers and retailers. In last couple of years, there has been a significant growth in specific segments like laptops and notebooks as globally prices of those items came down significantly.

STRATEGIC PRIORITIES

ACCESS TO FINANCE

The IT companies which have been able to manage access to required funding (both for setting up large scale operations and managing for working capital needs) from own or institutional sources to scale up their operation to their potential. So far, the majority of the investments in the software and ITES companies have been funded by sponsors' own source. There is significant scope for improvement as far as the government's financing mechanism is concerned. The EEF Fund, which was created by Bangladesh Bank was aimed at helping IT entrepreneurs meet their long term and short term financial need. However, this fund needs to be strengthened dramatically to reduce bureaucratic delays and fair evaluation of companies based on technical competence and access to market.

One of the recent initiatives for creating easy access of fund is IDCOL funded 'Sanchalak' program. Under this loan scheme, IT companies are eligible for accessing loan against specific work order from clients. This scheme also needs to be expanded to increase the coverage of companies.

Apart from the above limited windows of funding, Bangladesh Bank will work closely with private sector enterprises to design and develop specialized financial products that would address the need for operation and growth of IT companies. One of the suggestions that have been put forward by the industry is setting up a 'collateral guarantee fund' for IT loan (mainly working capital loan). This guarantee fund probably can address the common problem of reluctance by financial institutes to fund non-physical asset based IT projects.

Bangladesh Bank and Ministry of Finance will undertake specialized programme for enabling banking and financial institutions provide access to finance to ICT industry by building capacity of mid-level and top level bank officials and show the potential of ICT sector for financing and providing know-how on how to finance with risk mitigation. The programme will also include support to banking and financial institutions to launch special working capital and long term project funding.

Also, like in all other developed and developing countries, the main source for long term project funding for IT enterprises is private equity fund. In this respect, government and donor agencies may facilitate for setting up private equity fund (can be jointly funded by local or foreign private fund and development agency fund) for IT projects that would be managed by professional fund manager. At the same time, special provisions for IPO/Stock market listing (e.g. low level of mandatory paid up capital; currently it is Tk. 18 crore, much above the capital level of most of IT companies) can be made for IT enterprises so that these companies can raise required capital from share market.

Special provisions for IPO/Stock market listing (e.g. low level of mandatory paid up capital) will be explored for IT enterprises so that these companies can raise required capital from share market.

QUALIFIED HR

Being a knowledge industry, the most important industrial input for the IT industry is human resource. The industry needs a wide range of HR. As far as the HR for software industry is concerned, there are gaps in both quantity and quality. Every year, less than 5,000 graduates pass out in software discipline. This number is far low if Bangladesh needs to project itself as a major software exporting countries (it is opined by the experts that the number would be over 10,000 every year).

More students need to be enrolled from non metropolitan cities with relatively low overseas migration trends (colleges under national Universities must start IT education). Also, special education loan policy and scholarship needs to be provided to encourage students for IT education enrollment. The current declining trend of Science enrollment at secondary and higher secondary level must be reversed by awareness creation.

The other deficiency of the IT graduates is in terms of quality and relevance to industry. Most of these limited numbers of people are found not to have been trained in line with industry requirements (because of the problem of very little academy industry linkage, poor quality of teachers etc.). More industry involvement must be ensured during academic programs. Special programs should be undertaken for industry orientation of teaching staffs and modernization of curriculum according to industry requirements.

For most of the software and ITES companies, there is also deficiency with respect to availability of professionals at the mid level (managerial and technical leadership level). It has been found that the turnover rate in most of the software companies is quite high particularly in the mid level (every year a significant number of experienced professionals are leaving the country getting opportunities in countries like North America, Australia, Europe, Middle East and Japan). These problems of 'mid-level vacuum' are putting most of the companies in very difficult level for their pursuit of growth.

As far as the IT Enabled service industry is concerned, though there are widespread availably of low end resources like data entry there is a dearth of resources in specialized professionals, particularly for export oriented jobs. Similarly, though there are good opportunities worldwide for Financial/Accounting Business Process Outsourcing (BPO) jobs, the graduates who come from different Universities and Institutes often lack the functional skills (also the basic language communication skills) that are necessary for such kind of jobs.

For addressing the problem of human resource, a long term plan will be undertaken so that current supply of 5,000 yearly IT graduates can be increased to 10,000 in next 2/3 years. Students from non metropolitan cities with relatively low overseas migration trends (colleges under national Universities must start IT education) will be encouraged to enroll. Also, special education loan policy and scholarship will be developed to encourage students for IT education enrollment. More industry involvement will be ensured during academic programmes. The current declining trend of Science enrollment at secondary and higher secondary level will be reversed by awareness creation.

MARKET ACCESS AND COUNTRY BRANDING

For success in export, market access is very critical. There are number of competent and capable companies in the country who have not been so far achieved to their potential because of the lack in market linkage. Since Bangladesh is still not regarded as a major software/IT service exporting countries (like India), the buyers worldwide are still not pro-actively looking (like in the Garments Industry where buyers find out suppliers from Bangladesh) for competent service providers from Bangladesh. It is interesting to note that none of the globally reputed outsourcing/off-shoring index/ranking list Bangladesh as a potential IT outsourcing countries while some countries which have much less favorable conditions (in HR, Infrastructure, or business climate etc.) are listed.

However, in the coming years, if Bangladesh can rightly brand itself and arrange target market specific business linkage programs, there are possibilities that buyers will seriously look at Bangladesh as an outsourcing option. This is because the costs in other major outsourcing destinations (India and China) are getting very high. Also, there are not many countries in the world today that have the demographic and functional advantage of having a large pool of educated and trainable youth who, if groomed properly, can offer the unique combination of IT skill and English Language skill at a very competitive rate. For North American and a number of European countries (where English is either first or second language), this is quite an attractive proposition.

The government needs to take specific measures to promote the country branding through road shows, and targeted marketing efforts. The Ministry of Commerce/ Ministry of Science and ICT in collaboration with all ICT-related business associations will develop a 10-year master plan for promoting country brand including specific actions related to inclusion of Bangladesh in globally reputed outsourcing/off-shoring index/ranking list.

AVAILABILITY OF DOMESTIC IT PROJECTS

For IT companies to attain an operational maturity stage (in terms of quality service delivery) in order to be globally competitive, it is very important to have enough number of contracts generated from the domestic market. The recent initiatives of the government to undertake increasing number of e-Government projects is expected to generate opportunities for the local ICT industry. In this respect, it is important to ensure a level playing field for the domestic industry to compete with foreign companies for large projects. The government can consider providing special incentives for foreign companies to partner up with local companies to ensure technology transfer to domestic companies.

All ministries and various government agencies will identify projects where ICTs can be mainstreamed as well as projects related to building ICT infrastructure for implementation where Bangladeshi companies will be given preference and in case of joint venture initiatives the stake of local companies will be at least 51%.

All ministries will prepare projects to be implemented under public private partnership (PPP) framework, where private sector will provide services to the citizens and business on behalf of the government with a sustainable business model linked with domestic and foreign direct investment. A series of programs through Office of the PPP at the Prime Minister's Office will be organized which will include road show on PPP for attracting projects under the PPP modalities.

LOCAL LEVEL SUPPORT SERVICES

Not enough support services at local level - Every upazilla has to have IT support- government certified Maintenance Company at local level and also possible subsidies and service-level agreement with government.

IT PARK

The government in collaboration with development partners will build High-tech Park with complete facilities (facilities for employees, schools, medical support, recreation facilities etc.) for attracting foreign investment in the sector. Public-private partnership will also be considered as an option for such arrangements.

TELECOMS VAS SECTOR

The government will explore to create a regulatory framework for separation of carriers and VAS service providers to control trends in monopolization and encouraging growth of value added services market. The government will also work out a balanced system of revenue sharing between VAS companies and telecom operator – so that it encourages VAS companies investing in innovation and bringing in new services for the citizens' benefit.

Key Strengths and Opportunities	Key Challenges and Risks
- The industry has had steady growth in the last decade - The domestic demand for IT services has also seen decent rise in the last decade - The industry is driven by young and energetic entrepreneurs -	- Most companies have not scaled up beyond a certain point - Access to finance and availability of qualified human resources remain big bottlenecks to the growth of the sector - Inadequate country branding hurts chances for software and ITES exports

PARTNERSHIP STRATEGY

The government will work closely with the private sector for promoting ICT projects under PPP framework. It will also invite development partners in building key infrastructure for attracting foreign investment in ICT sector.

INDICATORS MEASURING PROGRESS

- Size of the companies (for service companies). Number of software companies that employ more than 100 programmers
- Financial sustainability of the enterprises. Per person revenue can be a good proxy index (to cover the HR and overhead of companies and to generate fund for implementing growth strategy, average per person revenue for any software company needs to be US$ 1000 per month; for ITES the amount can be US$ 500 per month)
- Global level industry branding- companies like AT Kearney publishes outsourcing index. Bangladesh ranking is between 60-70. It should be within 20-30 for giving confidence to clients and investors.

2. REVITALIZING KEY SERVICE SECTORS

2.I. 21st CENTURY EDUCATION

KEY PROBLEMS	• Education system does not focus on 21st century skills that include creative thinking, problem solving, collaboration and entrepreneurship. • The contact hours are inadequate to prepare students for the grade level and for employment at the end of school tenure. • Teachers in secondary schools often do not have appropriate background to teach a particular subject area. Teacher professional development, including refresher training, is inadequate or absent. Teacher training sessions come at significant reduction to contact hours. • High teacher absenteeism exists in primary schools. • Vocational stream is not attractive enough to students and parents, and not market-responsive. • Education administration is too centralized for effective monitoring, evaluation and refinement. • Focus of ICT in Education is predominantly on ICT literacy which does not benefit students in primary and secondary schools because it is not relevant to the rest of the curriculum. ICT literacy as part of teachers' training is not relevant to the teachers because there is no application of this literacy in teachers' day-to-day life in a school.
VISION	• Ensure a productive 21st-century-ready workforce • Bring reform in curriculum, pedagogy and teacher's capacity building to ensure quality education for all • Ensure transparency, efficiency and effectiveness at all levels of educational administration • Secure accountability to real stakeholder namely the students and parents and enabling the citizens to participate in policy making
OUTCOME	Every student becomes ready to face the challenges of the globalized 21st century world with training from an education system supported by high capacity teachers and an efficient governance mechanism.

STRATEGIC PRIORITIES	• **Teacher-led content development**: Teachers in primary and secondary schools will develop multimedia content for general subjects for classroom use. Teachers will share content across the country using various ICT mechanisms such as portals and mobile platforms. • **Interesting and interactive learning environment through multimedia classrooms in every school**: Every primary and secondary school will establish a multimedia classroom with a power-saving internet-connected laptop, projector/large-screen-TV and teachers professionally trained to display multimedia content for general subjects. The teachers will use digital content in the classroom for collaborative, problem solving sessions. • **Incentives for teachers based on performance and innovation**: Salary increments, bonuses and career movement for teachers may be instituted over time based on innovation and educational outcomes. Non-fiscal incentives may be designed in terms of recognition and opportunities for leadership in different levels. • **ICT literacy for students in the tertiary education**: ICT literacy, although not a necessity to be formally imparted in primary and secondary levels, will be mandatorily imparted at the tertiary level to prepare students for the employment market which increasingly demands ICT skills. • **Accelerating BdREN**: The Bangladesh Research and Education Network to connect all universities and research institutions with high-speed connectivity and access to international publications and researchers will be accelerated to ensure that our sizeable tertiary education population has collaborative access to the best and brightest minds. Such unprecedented access has been made possible by advancements and rapid proliferation of high-speed networks and rich content around the world. • **All education services to be made available online or through mobile platforms by 2012**: Expediting the pace of e-service creation by the ministries, directorates, and educational institutions at different tiers, all educational services will be made available through the internet or/and mobile phones, as appropriate, by 2012. Payment and fees for these services and salary and pension payments to teachers will be made possible through m-payments or online payments. • **Monitoring at the field level:** Close monitoring at the school level is possible through the use of mobile phones and internet. Successful models have already been tested in the country. • **Education TV or web TV**: The almost unused second terrestrial channel of the government may be turned into an education TV channel after the broadcast for Parliamentary purposes. As many as sixteen Ministries have already shown interest for producing educational content for this TV channel. • **Modernizing Bangladesh Open University**: Bangladesh Open University's full potential can only be realized if the education delivery is re-thought in terms of combined use of new ICTs such as the internet and mobile phones and old ICTs such as TV and radio based on successful collaborative e-learning models being used worldwide. • **Public-private partnership**: Many of the initiatives mentioned above will be most effectively and sustainably developed if done through a PPP model. Private sector companies and NGOs will be invited to join hands with the government in collaborative initiatives rather than creating parallel institutions.

INTRODUCTION

A brighter and fairer Bangladesh depends much on the agenda of education. No matter what kind of development strategy a country adopts for itself, education is always at the heart of it. Accelerating growth, establishing greater social equity, expanding agricultural productivity, or instilling better governance, in the long run, all come back to education. Since its independence, Bangladesh has been working hard towards developing a knowledge-centric vision amid significant challenges in the form of over-population, severe poverty, deadly natural disasters and mass illiteracy.

Bangladesh's is a large education system with almost 150,000 institutions, 34 million students and over 900,000 teachers (BANBEIS 2006). The country has achieved 85% enrolment ratio which is second only to Sri Lanka among SAARC countries. Bangladesh has already achieved the MDG goal of gender parity in both primary and secondary education (NPA-II). However, the drop-out rate is very high. About half the students who enroll in primary education drop out before completion. A very small fraction in primary school actually attains the learning outcomes. The results are no better in secondary education. Vocational education attracts 4-8% of the students depending on the study whereas the target is to reach 20% in the vocational stream by 2020.

There is relatively high teacher absenteeism in primary education. The secondary teachers often do not have the right background or are not trained adequately to teach effectively in schools. The tertiary education is considered to be too outdated to respond to market needs of a globalized society. Educational governance is overly centralized for such a large system, educational administrative services too unresponsive and overly bureaucratic.

The government, with the newly formulated Education Policy, is planning to build an education system that develops its students into competitive resources ready to survive and thrive in the 21st century, and a framework of educational governance that ensures this.

VISION

The government of Bangladesh's education vision is to:

- ensure a productive 21st-century-ready workforce
- bring reform in curriculum, pedagogy and teacher's capacity building to ensure quality education for all
- ensure transparency, efficiency and effectiveness at all levels of educational administration
- secure accountability to real stakeholder namely the students and parents and enabling the citizens to participate in policy making

The government is planning to eradicate the curse of illiteracy through proactive use of ICT. The new National Education Policy emphasizes the use of ICT to improve educational quality, based on different available and efficient delivery options (e.g. computers, cellular phones, radio, TV,

Internet, etc.) within Bangladesh. The policy aims to integrate ICT in the technical and vocational education. The government plans to make ICT education compulsory at secondary level by 2013 and at primary level by 2021. 53 out of 306 action items, which amounts to 17%, of ICT Policy 2009 focus on human resource development. The Skills Development Policy being prepared by the Ministry of Labour and Employment identifies ICT as a 'market skill'. The National Strategy for Accelerated Poverty Reduction (NSAPR II) also recognizes the need of improving country's knowledge base using education, training and research, and emphasizes on the importance of ICT as an invaluable enabler towards achieving this objective. Moreover, there are initiatives in place to facilitate national ICT examination to enable the general population to join the mainstream ICT workforce. The government also wants to use "proficiency in ICT applications" as one of the key benchmarks for employment in both public and private sectors.

The above clearly shows that there is no dearth of policy focus as far as ICTs in education are concerned. However, this focus does not translate to commensurate implementation. The term 'ICT in education' is mostly misunderstood to mean ICT literacy whereas the broader implication of utilizing ICTs to improve the quality of general education is missed.

OUTCOME STATEMENT

Every student becomes ready to face the challenges of the globalized 21st century world with training from an education system supported by high capacity teachers and an efficient governance mechanism.

SITUATION ANALYSIS

EDUCATIONAL STRUCTURE OF BANGLADESH

The present education system in Bangladesh can be divided into three stages: Primary, Secondary and Tertiary education. The primary education is managed by the Ministry of Primary and Mass Education (MOPME). At present, there are approximately 82,000 primary schools in the country (govt., registered non-govt., non-registered non-govt. etc.) with nearly 16 million students and 365,000 teachers. The post-primary education is under the administration of the Ministry of Education (MOE). Currently there are 317 public and 18,000 non government secondary schools functioning in Bangladesh. The numbers are 251 and 3000 for higher secondary institutions. At university level, there are 31 fully fledged public and 54 private universities. Figure 3 presents the current educational structure briefly.

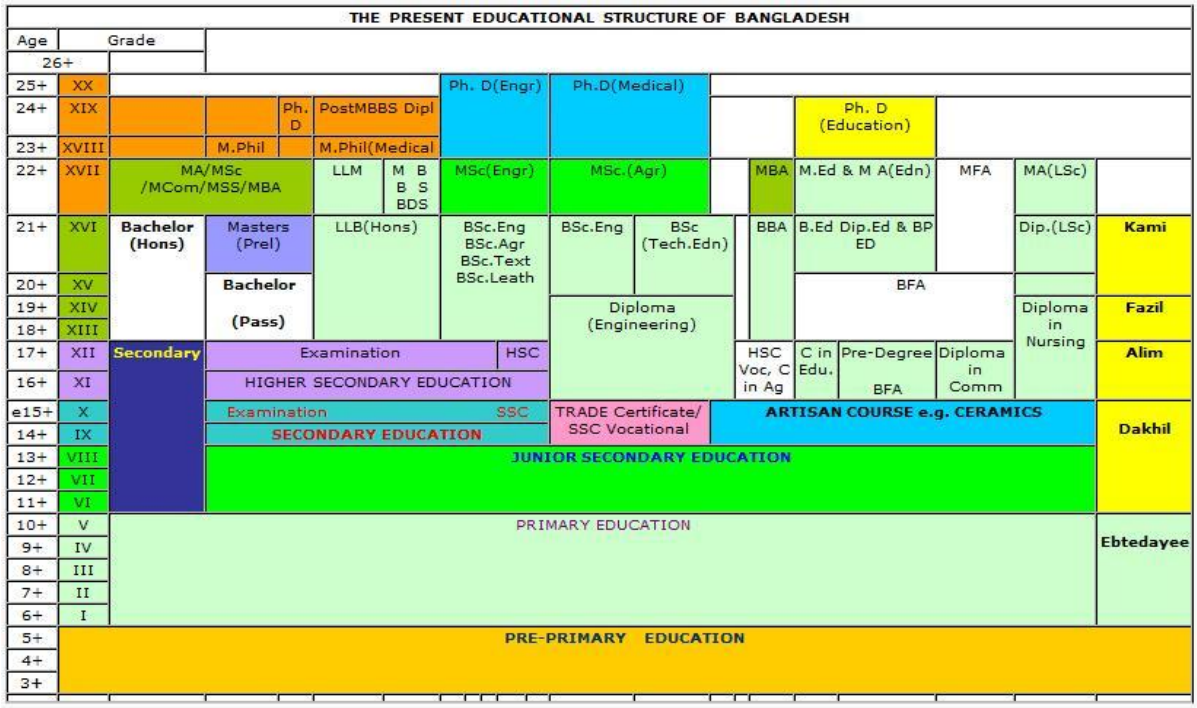


Figure 3: Educational Structure of Bangladesh (Source: BANBEIS)

The use of ICTs – computers, internet, TV, radio, mobile phones, etc. – towards education range over a number of issues:

- **ICT-based teaching-learning**: In today's globalized world, it is no longer enough to learn basic skills of reading, writing and arithmetic. The 21st century skills now include creative thinking, problem solving, communication and collaborative practices. The current teacher-centric paradigm of teaching methods promotes rote learning and fails to engender problem solving abilities in students. Classroom teaching-learning practices can be greatly improved through the use of ICTs. The term 'ICT in Education' primarily refers to this in contrast with ICT literacy which is the knowledge and skills to operate the ICT devices. Interactive ICT materials enable student-centred learning and spur individual or collective problem solving practices in classrooms. A fun learning environment in schools may actually contribute to a reduction of drop-outs as well.
- **Professional development of teachers using ICT**: Teacher training can be enhanced by using ICT-based materials. In secondary schools, 25% of math classes and 20% of science classes are taken by teachers with humanities background. More than 50% of the teachers have little to no professional training. 57% of teachers claiming to have Bachelor's degree had third division or lower; 39% of teachers claiming HSC level of qualification had third division or lower. As a teacher training aid, ICTs offer an effective mode of dissemination of good teaching style by allowing teachers to watch and learn from experienced, model teachers in real classroom settings without having to travel great distances and disrupting an actual class. Multimedia materials are very effective in imparting content knowledge also. Refresher training is possible through the use of ICTs.

This is certain to reduce cost of training for all parties, the organizers, schools and teachers (from public and private institutions). High quality trainers are costly and difficult to find. Standardized classroom examples via multiple ICT enabled channels make the pre-service and in-service teacher training cost-effective. Even schools in the remotest parts can aspire to use standardized audio-visual content for classroom teaching. It also helps the GoB to develop a digital archive of all the teaching and training materials at primary and secondary levels.

- **ICT literacy for students**: The government is placing a very high emphasis on ICT literacy for students with the target of ensuring this for all secondary school students by 2013 and for all primary school students by 2021. However, experience in Bangladesh and globally has shown that ICT literacy is not something that needs to be 'imparted' through school curriculum. The more important goal should be to provide access to students and integrate ICT in general curriculum. ICT literacy for primary and secondary students will happen automatically since children of that age are, without exception, drawn to ICTs and master ICT literacy in a very short time. Any formal training may actually hinder normal learning progress of a student. Moreover, current mindset to make everybody ICT literate is a costly one (by many orders of magnitude), in comparison with the collective, in-class ICT enabled teaching environment, which makes the delivery of education easier, cheaper and more efficient. However, ICT literacy for teachers is important but only with the specific objective to integrate ICTs in the teaching-learning process mentioned above, and hence, the ICT literacy topics for teachers must be chosen with this objective. For students at the tertiary level, the ICT literacy may need to be imparted through formal training.
- **Education-related citizen services**: Various services to students, parents, teachers can attain significant efficiency gain, cost reduction, time savings, and higher level of transparency if ICTs are used in the delivery process. Submission of applications for admission and other services, publishing examination results are among very popular e-services for education.
- **ICT in education administration**: Ranging from the Management Information System to maintain up-to-date databases of educational institutions, officers, teachers, students and various resources to Geographic Information Systems (GIS) for planning, ICTs have ample scope to raise efficiency, transparency and accuracy of decision making within the government. Sharing of information across the government and private/NGO education management can bring unprecedented collaboration between these two very vital and necessary groups of education actors. New, simple and yet pervasive technologies such as mobile phones allow data collection at the school level and even monitoring of teacher absenteeism.

ICT BASED TEACHING/LEARNING

Under the 'ICT-enabled Teacher Training Program' of Ministry of Education, some digital contents have already started to be developed which is known as 'Self-Learning Multimedia

Teachers' Training Materials (SLMTTM)'. These contents are developed for the secondary school teachers, which can help them to enhance the quality of teaching-learning process in classroom. Contents will be developed based on the identified problems of selected text-contents of grade VI's English, Science and Mathematics which are difficult-to-teach or difficult-to-understand. Similar initiatives are taking place at primary education level. Madrassa education board and vocational education programs are lagging behind in integrating ICT for classroom delivery and pedagogy.

The English in Action programme of DFID has produced a large volume of materials for primary, secondary and lifelong learning. Non-government organizations such as Development Research Network (D.Net), Foundation for Education Research and Innovation (FERI), BRAC University Institute for Education Development (IED), Ananda Multimedia, among many others, have been producing such materials for English, Science and Mathematics for a number of years but their use is mostly limited to schools in pilot areas.

A recent initiative by the Ministry of Education has disseminated selected multimedia materials to about 600 schools. Considering the thousands of schools to be covered with multiple education systems (and delivery mechanisms), the GoB has a huge task in its hand to be addressed as soon as possible to disseminate multimedia materials to all schools and equip the teachers to use them for in-class pedagogy. The situation is worse for Madrassa since the shortage of digital pedagogical content for this stream of education is even higher.

PROFESSIONAL DEVELOPMENT OF TEACHERS USING ICT

Within the education sector, ICT integration has been initiated in two sectors: human resource development (mostly teacher training) and student education (content development and delivery). In primary education sector, there is 54 Primary Teacher's Training Institutes (PTI) in Bangladesh and among those; six PTIs have fully fledged ICT labs (with 25 PCs, multimedia projector, printer). Similar labs are being developed for 25 PTIs and eventually for the rest. The primary goals are to use digital content for teacher training and to provide basic ICT education for the trainees. Most of the PTIs are running dual-shift training programs. The ministry has also started to equip the 502 URCs with a color TV and a DVD player (in addition to approximately 6000 PCs and net connectivity) in phases. The goal is to use audio-visual content for standardized teacher training at upazila level.

For teacher training in secondary and higher secondary education, 20 computer labs were established for each of the Teachers' Training Institutes in the country (14 Teacher Training Centres/TTC, 5 Higher Secondary Teacher Training Institutes (HSTTI) and 1 Bangladesh Madrassa Teachers' Training Institute (BMTTI) under the Teaching Quality Improvement for Secondary Education Project (TQI-SEP). The project has also introduced 17 mobile vans with Laptop, Internet connection, Generator, Multimedia Projector, Camera and other ICT training equipments for 14 TTCs and 3 Outreach Resource Centres. The MOE, DSHE and BANBEIS are now sharing data with fibre optic link which was also established by this project. Under its training program 4,000 teachers were given training on Computer and 15,332 Head Teachers

on ICT. The project possesses a Secondary Teachers Information System (STIS) database which contains some basic and training related information of the secondary school teachers. The government has also active partnerships with private sector entities like Microsoft for providing better training to its teachers. Approximately 2,250 teachers received training under this agreement last year. In addition, 3,000 more teachers from secondary schools also were given computer training using public funding.

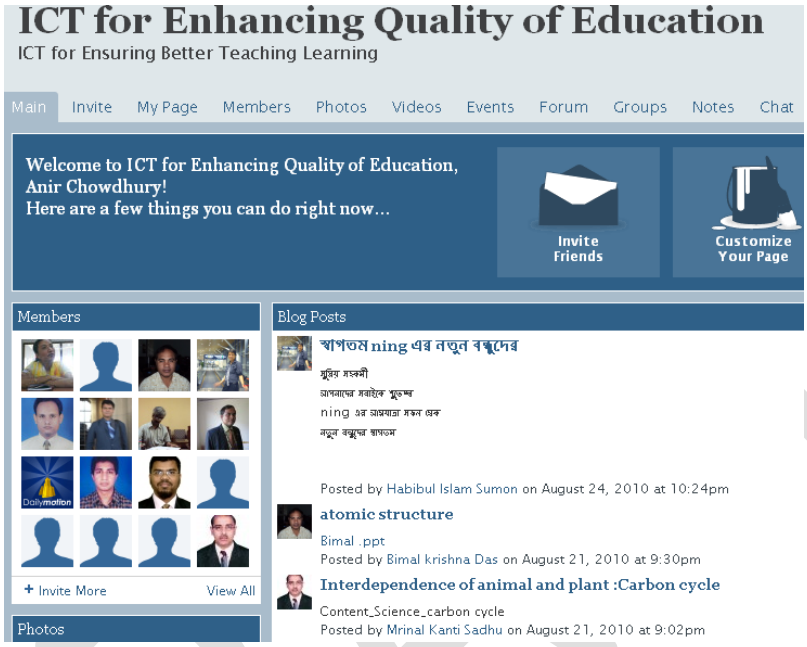


Figure X

Moreover, for secondary school teachers, the government has initiated teacher training on multimedia content development by the teachers using simple ICT tools such as presentation software with basic animation features, internet search engine like google and online video/image repositories. All TTCs, HSTTIs and BMTTI trainers have been trained on this through collaboration between A2I and TQI. Figure X shows a blogsite where the trainers share contents they are creating. In private sector, BBC with its “Connecting Classrooms” project has covered more than 200 schools on similar online based, interactive teacher training.

At technical and vocation training and at the tertiary level, there is significant scope for improvements in concerted efforts taken by the government to provide trainers/instructors/teachers need-based short or long term ICT training. Disconnect between ICT training and professional application is a major problem. ICT literacy training programs from teacher training centres are good but teachers often cannot apply it in their daily lives outside the classroom. The curriculum is not very much geared towards application in real life or career enhancement.

Absence of skilled human resources, especially in the "Training of the Trainers" sector (at all levels of education), results in high trainer-trainee ratio in teacher training, fails to ensure a cohesive learning/teaching environment within any TTC. Many of the computer labs in different schools and madrasas remain unused because of the dearth of skilled computer teachers.
Lack of tangible incentive mechanism for the teachers in ICT training as mentioned previously also plays a big role in disengaging teachers from being involved in getting effective ICT training.

ICT LITERACY

The GoB has introduced computer/ICT education and skill development in the secondary and higher secondary education sectors. Computer education has been an elective subject at secondary level since 1996. At present, 9,000 schools (out of 18,770) and 3,500 madrasas (out of 9,736) continue to offer this course. The government has also taken several initiatives to modernize and update the computer/ICT related curriculum at secondary and higher secondary level. The SSC students will be able to study using the updated ICT curriculum during the 2009/10 session and for HSC students, it would be available by the next session.

In addition, there are 37 government polytechnic institutes and 64 technical colleges in different parts of the country, where ICT is part of the core curriculum. These institutions offer both long term diploma as well as market driven short courses in ICT (in high demand). In addition, the Directorate of Technical Education (DTE) has established a state-of-art computer training institute at Feni. This institute is developing a range of useful software (catering local government and private markets) and also offers ICT training courses. From 2009, Computer Science has been included as a mandatory subject for the SSC Vocational examination.

There is the important issue of non-interactive and less effective ICT literacy initiatives in Bangladesh. The syllabuses are traditionally more curriculum based than skill/competency based, which at times forces students to rote memorization of the content than to be competent on the skill sets in focus. With the present level of competencies a student can achieve in ICT after the completion of SSC/HSC, hardly anyone can get a job in the ICT industry. This situation points out to the effectiveness of ICT based learning at the current state in Bangladesh than to just focusing on ICT literacy. For ICT education within the technical and vocational training, at present the curriculum is not linked with the industry needs.

The Internet is heavily underutilized as one of the primary tools for disseminating ICT literacy in Bangladesh. Literature shows the huge positive impact any Internet based, openly designed programs can have in making a focus population ICT literate. In tertiary education, especially in the leading public and private universities, ICT literacy has become a mandatory part of any student's learning experience, across most of the departments/major programs (i.e. in humanities, social sciences, business, sciences).

EDUCATION RELATED CITIZEN SERVICES

Majority of the citizen services provided by GoB in the education sector using ICT are related to examination results and online registrations. A key milestone of ICT application in primary education is the online publication of primary terminal examination at the end of 2009. Approximately, 2 million sit for this exam and results were accessible via internet and SMS services. In 2009, the results of SSC, HSC, Dakhil, Alim and similar examinations have been simultaneously published in the web, sent to people via SMS and were also emailed to selected educational institutions. The plan is to expand and continue these services in the coming years.
In administration, GoB is using ICT based options for connecting 9 regional and 64 district education offices; publishing results of SSC, HSC, Dakhil, Alim or similar examinations through web (since 2004) and SMS (since 2008); and integrating GIS with all post primary educational institutions. BANBEIS, the premier body for educational data and statistics also updates related information on a regular and transparent basis.

The Ministry of Education has also started the "Electronic Students Information Form (e-SIF) projects, under which SSC and HSC examinees will be able to register their necessary information in the MoE system. Under the jurisdiction of the National University, Dhaka College and Shahid Sohrowardi College has started online admission process for the first year students this year (2010), which will be replicated to other colleges in the upcoming academic sessions. Eden College, a prominent public women's college has proposed online tuition fee payment options for its students. Among public universities, Shahjalal University of Science and Technology has incorporated SMS service with its student admission. University grant Commission is actively considering to design a website where all recognized universities' general and admission related information will be available. Students of different polytechnic institutes are also using online registration forms, provided by their institutions. The Technical Education Board is also planning to publish all the important text books online in the near future. The GoB has also started a joint initiative with European Commission (EC) and International Labor Organization (ILO) to reform the technical and vocational education and training sector (TVET program). Under this program, the plan is to design a "National TVET & Skill Database System" and a common website with information about demand and supply in local and international labor markets.

ICT IN EDUCATION ADMINISTRATION

Nationally, ICT integration process in primary education received a significant boost with the start of the second Primary Education Development Program-II (PEDP-II) initiative. At administration level, the plan is to connect 502 Upazila Resource Centres (URC, constituted under PEDP I) through VPN/FTP network and the MOPME is hoping to develop this infrastructure by mid-2010. After the connectivity completion, the ministry is hoping to start real time data update from the URCs, which in turn will ensure interactive and transparent data mobility.

The Directorate of Secondary and Higher Education (DSHE), through its project titled Secondary Education Development Program (SESDP), has established a decentralized Education Management Information System with a central EMIS cell, 09 in its zonal offices and 64 in District Education Offices. The zonal and district level offices are using wireless modem for internet connectivity. The central EMIS in DSHE has developed 17 software modules for administering the office, to maintain the teachers' database and to process the Monthly Pay Order (MPO) for the teachers. A school database system has also been developed for regular web-based on-line up-gradation of school data. Similar to the board examinations, results of the teacher selection process have also started to be published in the web and distributed via SMS. The Madrasa Education has also developed an office automation system for its inventory management, accounts, auto check printing etc. It also has an official website which is updated on a regular basis.

Moreover, the MoE has started the automation of all the libraries and documentation services under its jurisdiction. MoE is planning to establish a dedicated information network system with every organization/institutions under its administrative umbrella. The ministry is also establishing online services through the integration of post-primary database and GIS school mapping, provided by BANBEIS. But data/system updates of these services are mostly project-driven and have seen limited use by the policymakers. Efforts are also underway to develop website to simplify the pension payments of the teacher from non-government academic institutions.

A major challenge in using ICT in administrative work is the absence of follow up in keeping the automated systems updated with relevant information. There are instances where administrative work and decisions are made centrally even with the ICT infrastructure developed up to the micro-level. Absence of trained human resource, motivation, incentives and official de-prioritization are some of the factors behind such scenarios.

Numerous projects under different ministries and funded by local initiatives or foreign donors in the domain of "using ICT for administration" are under implementation over the years in Bangladesh. But the absence of structured monitoring and evaluation of these projects results in loss of critical "lessons learned". It's imperative for the policymakers to have thorough knowledge about such development programs to make decision making process in this sector more efficient, transparent and accountable.

Insufficient synergy among multiple stakeholders in policy making and implementation, create roadblocks towards digitization. For example, for technical and vocational education, multiple ministries (at least 13 ministries are involved in various project, e.g. Youth and Social Welfare, Education, Labor) are working separately on a number of training and educational projects, causing "reinvention of the wheel" scenario at the cost of scarce public fund.

ICT INFRASTRUCTURE AND DELIVERY CHANNELS

Out of 37,762 government primary schools in Bangladesh, about 7,000 schools have electricity, a key enabler for micro-level ICT applications. The ministry is planning to develop digital educational content and disseminate it through laptops in the schools with power. For the majority of schools outside the service of national power grid, different options for connectivity and content sharing through mobile/wireless network are being actively considered.

Till now, 17,000 PCs have been provided through the MoE for setting up ICT labs. Under the direct supervision of Bangladesh Computer Council (BCC) 128 new computer labs with internet connectivity have been established (64 schools and 4 colleges). BCC is also setting up computer labs in 3,000 more schools nationwide. In addition, the GoB also distributed approximately 1,400 laptops to 568 schools and 64 colleges. The Directorate of Secondary and Higher Education (DSHE), through its project titled Secondary Education Development Program (SESDP) has established modern ICT laboratories in 20 pilot schools with twenty Computers each, Server, Multimedia Projector and other accessories. Construction of the same in 30 Model Madrassa is in progress. The mobile labs mentioned before for teacher training purpose are also utilized for introducing different ICT delivery medium to the students in remote areas. Each lab is equipped with five laptops, five internet modems, two digital cameras, one multimedia projector, webcams, multifunctional printers, pen drives, interactive board, CDs, speakers, headphones and a generator.

In order to make the concept of the "Multimedia Classroom" (please see box: Multimedia Classroom) a success, multimedia projectors are also being supplied to the classrooms with laptops or PCs. The Islamic Development Bank (IDB) has financed 100 computer labs for the madrasas all over Bangladesh. In addition, there are some private initiatives for setting up computers labs in different madrasas. In coordination with the national ICT policy's prescribed action plans, initiatives have been taken place to select and develop model schools as "Information Access Centres" at union level for public usage. Moreover, nine regional and 64 district office of MoE now have net connectivity and efforts are in place to provide internet connection to all government schools and colleges. Among the mobile-based education delivery channels, BBC's Janala platform to teach English has gained some popularity.

Multimedia Classroom

An example of a Multimedia Classroom environment

This classroom has the multimedia technologies which can be used for teaching-learning purpose. In multimedia classroom difficult text-contents can be delivered using ICTs. Following components are required for making a multimedia classroom: a big size classroom, a computer/Laptop, a multimedia projector, sound system/speakers a Microphone (if needed for very large classroom), white/black board and other teaching-learning materials. In a multimedia classroom, a teacher can show related digital contents (e.g. video, animated, picture, PowerPoint based etc.) to make learning easier for his/her students. A particular pre-scheduled routine can be followed for the subject teachers who want use the multimedia classroom.

Scopes of the Multimedia Classroom:

1. Difficult-to-understand contents can be delivered easily by using video, animated or PowerPoint based digital contents
2. Big classroom (60-70 learners) can be managed
3. Students' assessment can be done
4. Students' participation in teaching-learning process

Interactive group learning:

This classroom will facilitate interactive group learning provides through observations, discussions, exploration, problem solving, with peers and teacher. It certainly makes the process fun but also nurtures teamwork and collaboration.

Benefits of the multimedia classroom:

Interesting and enjoyable learning is easy to remember, sustainable learning, collaborative environment, development of critical thinking, fun and interactive environment, and learner centric pedagogical approach.

At tertiary level, the Open University of Bangladesh has been established to ensure the efficient delivery of knowledge through distance learning, using various ICT options. With high-skilled work force, media centres, ICT based infrastructure for content development and dissemination (92 delivery outlets, all over Bangladesh), this university is capable of catering to the need of a large population in various educational, technical and vocational courses via face-to-face, traditional broadcasting or net based virtual class rooms.

Significant digital and information divide exists among rural and urban schools, in terms of human resource, ICT connectivity, digital content availability, affordability and accessibility. There is a real risk that uses of ICT based options can further marginalize groups already excluded or on the edge of educational practices and innovations. On the other hand, with supportive policies and careful planning and monitoring, ICT hold out the promise of facilitating greater inclusion of such groups.

Girls on average have less access to ICTs and fewer opportunities for ICT-related engagement compared to boys because of illiteracy lack of time, lack of mobility, and poverty. It is likely that despite efforts to make the program gender neutral, gender inequalities in access may still persist. As a result the introduction of ICTs in education, done without careful deliberation, will result in the further marginalization of those who are already underserved and/or disadvantaged. Limited use of the existing "state of the art" installation (e.g. Bangladesh Open University), absence of synergy with other education dissemination initiatives.

Key Strengths and Opportunities	Key Challenges and Risks
• The extremely high policy focus on using ICTs to improve the quality of education and produce high-quality human resources • Some successful models for ICT-pedagogy integration in Bangladesh have been tested • The teachers and students generally very eager to use ICTs for educational purposes • A good number of educational services available through internet and mobile phones. The Ministry of Education, the education boards and the directorates have been pioneers in ICT-based service delivery in the country. • MIS systems for planning and decision making relatively strong for both ministries of education.	• Education system does not focus on 21st century skills that include creative thinking, problem solving, collaboration and entrepreneurship. • The distinction between ICT literacy and use of ICTs for improvement of general education still blurred in the policy maker's mind. • Overemphasized focus on hardware and ICT literacy and not enough on teacher professional development to utilize this hardware for in-class teaching-learning. This is demonstrated by wrongly placed focus to develop computer labs in schools and almost zero integration of these labs to educational outcomes. • Lack of multimedia materials for teacher training • Lack of multimedia materials for teaching-

	learning • Inadequate focus on establishing high-speed connectivity to educational institutions • No incentive mechanism to recognize teachers' performance to innovate and show results

STRATEGIC PRIORITIES

Wide-spread creation and use of digital content in teaching-learning: Appropriate and effective educational content development in a larger scale is necessary. GoB will coordinate development of such content through its existing projects, new programmes and efforts by private sector and NGOs. The e-tathykosh portal (online and offline national content repository) being created by the Access to Information programme at the Prime Minister's Office may be the initial placeholder of much of this content, but ultimately much of the content may come from private sector/NGO efforts. In order to ensure a significant impact and economies of scale in education related investment, the GoB will increase the scope and distribution sphere of these digital contents.

Teacher-led content development: Teachers in primary and secondary schools will develop multimedia content for general subjects for classroom use. Teachers will share content across the country using various ICT mechanisms such as portals and mobile platforms. The e-Tathyokosh platform may play a supporting role in hosting this content in the beginning.

Interesting and interactive learning environment through multimedia classrooms in every school: Every primary and secondary school will establish a multimedia classroom with a power-saving internet-connected laptop, projector/large-screen-TV and teachers professionally trained to display multimedia content for general subjects. The teachers will use digital content in the classroom for collaborative, problem solving sessions. In establishing the multimedia classrooms, the focus is always on pedagogy and not on technology. The selection of technology must be in accordance with national reality of availability of electricity: preference for laptops with long power backups rather than desktops, devices that run on alternative energy sources, hybrid technological solutions using a combination of mobile phones, community radio, TV, web TV, etc.

Stronger focus on vocation and technical education: In technical and vocational training program, the ICT programs will be competency based. The GoB needs to work with the industry to fix the competencies, curriculum, and then those can be vetted by the universities. ICT education/skill would be a part of the nation building effort and strategic focus would be on technical education and work at school level.

Incentives for teachers based on performance and innovation: Salary increments, bonuses and career movement for teachers may be instituted over time based on innovation and educational outcomes. Non-fiscal incentives may be designed in terms of recognition and

opportunities for leadership in different levels. Loans to teachers to buy ICT equipments will provide a substantial boost to teachers' productivity and interest. These loans can be linked to incentive mechanisms for teachers who are able transform classroom practices using ICTs.

ICT literacy for students in the tertiary education: ICT literacy, although not a necessity to be formally imparted in primary and secondary levels, will be mandatorily imparted at the tertiary level for all subjects to prepare students for the employment market which increasingly demands ICT skills. The primary strategic focus will be on some 1,500 colleges under the National University all over Bangladesh, preparing 80% of the higher education graduates. Needless to say, these are the colleges that are lagging behind the universities in terms of availability, accessibility and affordability of computers, connectivity, trainers, ICT learning materials.

Accelerating BdREN: The Bangladesh Research and Education Network (See box: BdREN) to connect all universities and research institutions with high-speed connectivity and access to international publications and researchers will be accelerated to ensure that our sizeable tertiary education population has collaborative access to the best and brightest minds. Such unprecedented access has been made possible by advancements and rapid proliferation of high-speed networks and rich content around the world. It offers Bangladesh a chance of leapfrogging to knowledge based society, and for developing effective partnerships with European Union and other multinational research entities through transcontinental connectivity. One of the services provided through BdREN would be to share education resources like high quality classroom lectures at tertiary level all over Bangladesh (like the African Virtual University, which facilitate teaching in Ethiopia from Harvard University through distance learning). This effort certainly will address the "scarcity of good teachers/trainers" issue to a greater extent.

BdREN: Key towards Knowledge based Society

University level educational institutions (both public and private) mostly ensure net connectivity and related ICT infrastructure through individual arrangements. An effort to create a country wide research and education network can help Bangladesh to leapfrog in becoming a knowledge based society. With this thought in mind, country's University Grant Commission (UGC) is actively pursuing the concept of "Bangladesh Research and Education Network" or BdREN. BdREN will provide specialized internet service for the research and academic communities of Bangladesh. It will be supported by a high-speed backbone network. In order to ensure faster connectivity and collaboration with the international research and education network, BdREN is planning to be connected with TEIN3, the third generation Trans-Eurasia Information Network (a dedicated intercontinental network for research and education with a speed up to 2.5 gigabits per second).

Figure 2 shows the connection of BdREN with TEIN3 (already developed) and the proposed design of BdREN network in Bangladesh. Discussion with Power Grid Company of Bangladesh (PGCB) is going on for using the entity's fibre optic network as BdREN's internal backbone.

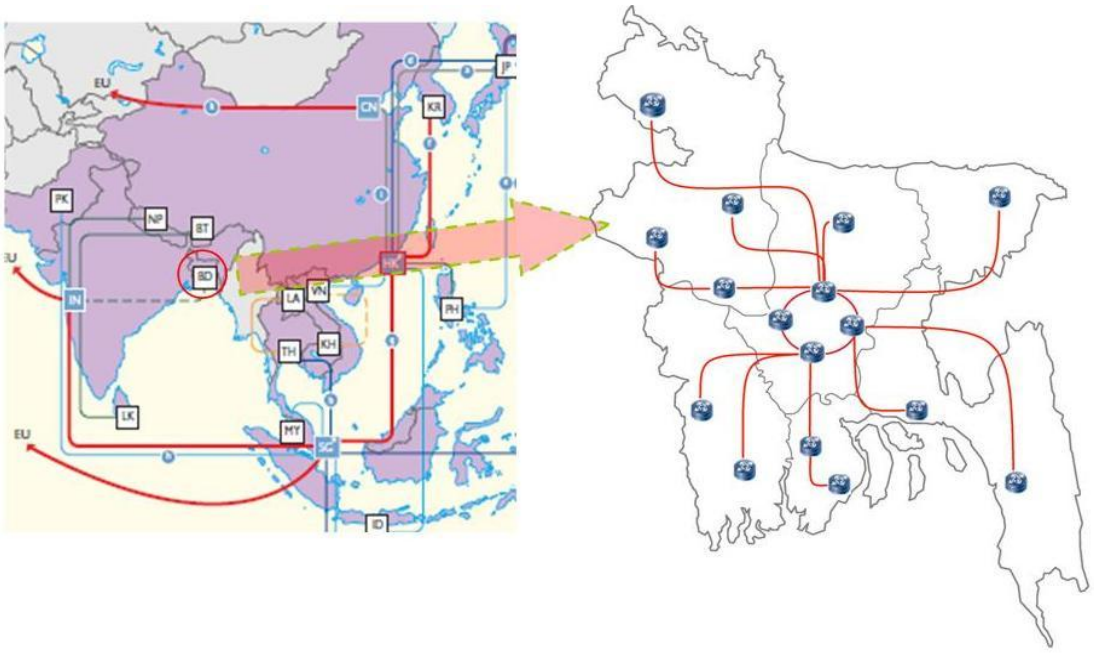


FIGURE 4 [UGC, TEIN3]

Once the BdREN is in place with appropriate approval from different government ministries, it would be able to provide some of the key services for Bangladesh's universities and research institutes: Access to high speed and cheaper internet bandwidth; Development of a centralized knowledge network; Sharing of large-size data among member universities/institutes; Access to electronic journals, digital libraries and e-resources; Web streaming services with video lectures and video conferencing, etc. For effective application development and implementation in areas like telemedicine, agricultural research, climate change and disaster warning, BdREN has the potential of functioning as the knowledge centric infrastructure in Bangladesh.

All education services to be made available online or through mobile platforms by 2012: Expediting the pace of e-service creation by the ministries, directorates, and educational institutions at different tiers, all educational services will be made available through the internet or/and mobile phones, as appropriate, by 2012. Payment and fees for these services and salary and pension payments to teachers will be made possible through m-payments or online payments. The concerned ministries and education boards will share their expertise and bring in expertise from Universities in using ICT based delivery channels especially with the National University system, under which approximately 1,500 colleges provide tertiary education to millions. Online academic resource sharing networks, where students and teachers will have dynamic access to learning and teaching materials for different levels of education and public examinations.

Monitoring at the field level: Close monitoring at the school level is possible through the use of mobile phones and internet. Successful models have already been tested in the country. These will have a positive impact to reduce teacher absenteeism.

Education TV, web TV and community radio: The almost unused second terrestrial channel of the government will be turned into a education TV channel after the broadcast for Parliamentary purposes. As many as sixteen Ministries have already shown interest for producing educational content for this TV channel. Community radio will play an important role for educational improvement in local areas.

Modernizing Bangladesh Open University: Bangladesh Open University's (BOU) full potential can only be realized if the education delivery is re-thought in terms of combined use of new ICTs such as the internet and mobile phones and old ICTs such as TV and radio based on successful collaborative e-learning models being used worldwide. In this regard, the government will develop a comprehensive plan to utilize BOU for ICT-enabled secondary and tertiary level education, teacher training, lifelong learning and professional education.

Public-private partnership: Many of the initiatives mentioned above will be most effectively and sustainably developed if done through a PPP model. Private sector companies and NGOs will be invited to join hands with the government in collaborative initiatives rather than creating parallel institutions. Cost-effectiveness in these initiatives is key, as technology investments typically run high and in many cases divert funds from other equally pressing needs. There may be need to develop multiple channels of financing through community participation to ensure economic sustainability. At the same time, in a rapidly changing technology environment, technological sustainability becomes a particularly tricky issue as planners must contend with the threat of technological obsolescence and the tendency to acquire the latest technologies. The rule of thumb must be to let the learning objectives drive the technology choice and not vice versa—the latest technologies may not be the most appropriate tools for achieving the desired educational goals. When making technology decisions, in addition to the upfront costs, the availability of spare parts and technical support cost also needs to be considered.

PARNERSHIP STRATEGY

The government needs to partner with large NGOs and private sector educational institutions to make the most sustainable educational delivery possible. Often the private sector has the opportunity to experiment more flexibly than the government and lead to innovations that the government can adopt. Significant possibilities for collaboration and joint initiatives exist in e-services, multimedia content development, teacher professional development and infrastructure development for connectivity and classroom/lab setup at the school level. TV, radio and community radios as avenues of education delivery must be pursued through join efforts.

INDICATORS MEASURING PROGRESS

- Proportion of students starting grade 1 who reach grade 5
- Student results in SSC and HSC; grades in Math and English
- Proportion of students in vocational stream
- Average income of vocational graduates within 2 years of graduation
- Literacy rates: 15-24 year olds, 24+ years
- Number of multimedia classrooms
- Amount of multimedia educational content: developed by GoB, developed by NGOs/private sector, developed by teachers
- Absenteeism of teachers
- Access to international research materials at the tertiary level
- Number of material hours of educational TV/web TV

2.II. UNIVERSAL QUALITY HEALTHCARE

KEY PROBLEMS	• Inadequate healthcare services to the marginalized citizens due to lack of availability of doctors in rural areas and high cost of services in health facilities. • From a healthcare administration point of view, challenges exist with respect to accountability, promptness of service and timely decisions regarding strategic interventions.
VISION	Quality healthcare services to doorsteps of all citizens.
OUTCOME	The capacity and management strength of the healthcare delivery system ensure that citizens access quality health care services and are adequately prepared for emerging health threats and challenges.

STRATEGIC PRIORITIES	
	HEALTHCARE MANAGEMENT The government will set a holistic healthcare vision and will design a plan towards a coordinated goal. The Ministry of Health will play a stewardship role guiding and coordinating efforts. All related departments will ensure better transparency and accountability ensuring citizens access to health related information and services. HUMAN RESOURCE AND ACCESS TO KNOWLEDGE The government will focus on address shortage of ICT manpower. It will put in place proper monitoring system to monitor attendance, absenteeism and quality of service delivery. Health education will be arranged to service providers using ICT. Medical faculties will be connected to address remote medical needs. **HEALTHCARE SERVICES** Telemedicine, particularly mobile phone based solutions will be launched at a national scale to provide medical information, consultation and services. For clinics and hospitals standard operating procedures will be developed. Patients' information and queue management protocol will be automated. Availability of essential drugs will be monitored. Health promotion and communication will be strengthened. Systems will be designed to ensure access to person with disabilities. **HEALTH AND DEMOGRAPHIC INFORMATION** National data on health indicators will be consolidated and updated. To maintain an integrated health record the electronic health record (EHR) will be developed. The geographical reconnaissance database will be completed. Access to research reports will be ensured. Health data will be standardized and cooperation among large health facilities in disease surveillance will be strengthened.

INTRODUCTION

Like most developing countries, Bangladesh also faces significant challenges in ensuring adequate healthcare services to the marginalized section of the population. Some of the well-know reasons for that include lack of availability of doctors in rural areas and high cost of services in health facilities leading to mushrooming of exploitative health-agents in local communities. From a healthcare administration point of view, challenges exist with respect to accountability, promptness of service and timely decisions regarding strategic interventions. The government has been exploring ways of using ICTs for addressing these challenges with some innovative initiatives and setting grounds for broad level changes in healthcare service delivery mechanisms and administrative reforms.

The Government of Bangladesh has placed a high priority on e-Health, which is reflected in the ICT Policy 2009. The strategic areas/issues relevant to health in the ICT Policy 2009 include the following (Clauses 7.1-7.4 of ICT Policy):

- Improve healthcare delivery management through use of telemedicine and modern technology

- Create awareness at all levels, including hard-to-reach areas with particular importance in making maternal, child and reproductive care available.
- Ensure quality of care
- Increase the capacity of health care delivery system

The Policy details a breakdown under each of these priority areas and provides targets to be achieved at the end of each term. While this is a positive way forward in planning specific ICT interventions, it is also important to match up the priorities with goals set in HNPSP and the new National Health Policy so that all guiding documents point to a definite direction and its execution is clear to the implementers, both in public and private sector. Specifically, clause 16 of the NHP 2010 emphasizes on the provisions of the ICT Policy of 2009 and the Vision 2021 for Digital Bangladesh.[i]

The NSAPR II emphasizes the need for the government to focus on effective service delivery and preparedness for emerging health threats and challenges. The NSAPR II also identifies affordable, attainable and acceptable quality health care, nutrition and family welfare services, increased health status, reduced health inequalities, expanded access to social safety net (with specific focus on the poor and the vulnerable), and affordable service delivery as government's priority areas at a macro level. It is important to specify actionable areas through which quality of health, better equality, social safety net, community participation and ownership in this sector can be ensured.[ii]

The government emphasizes on ensuring health facilities to all citizens, adoption of a revised health policy, operationalizing the 18,000 community clinics, updating the population policy and addressing birth control and reproductive health accordingly, addressing the arsenic problem by supplying pure drinking water and providing sanitation facilities in every household, and devising an appropriate pharmaceutical policy.[iii]

While national policies and visions constitute guiding documents for implementation in the health sector, international commitments such as the millennium development goals (MDGs) also play an important role in setting national priorities. MDGs 4, 5, 6 and 8E have direct implications for the health sector.

VISION

Quality healthcare services to doorsteps of all citizens.

OUTCOME STATEMENT

The capacity and management strength of the healthcare delivery system ensure that citizens access quality health care services and the system adequately prepared for emerging health threats and challenges.

SITUATION ANALYSIS

The Ministry of Health and Family Planning has made significant progress with respect to developing management information systems in health care. The Department of Health and the Department of Family Planning both have dedicated ICT personnel for managing and constantly improving their systems.

DEPARTMENT OF HEALTH SERVICES

Increased connectivity: The Bangladesh government connected 800 health care facilities in May 2009 and other access points through the Internet with the aim to improve health system's efficiency. All facilities from Upazilla and upwards are included in this scheme and are connected through unlimited wireless connectivity.

Telemedicine: People in rural Bangladesh struggle to access timely and quality medical service either due to the distance of the health care facilities, or due to lack of adequate medical providers. Telemedicine or tele-health enables patients-providers to exchange information, which leads to an appropriate diagnosis and treatment plan that can then be administered by moderately trained health staff or even the patient alone.

Provisions are being created for video conferencing with civil surgeons. The government is planning to provide mini laptops for 18,000 community clinics and to train staff to utilize the tools for appropriate situations. This initiative will offer web conferencing which will address a number of challenges related to professional consultation currently faced by medical professionals in remote communities.

Mobile phone health service for emergency situations is also a project that was launched in May 2009 with an aim to enable qualified government doctors to provide free medical advice. A mobile phone device was given to all 64 district hospitals and 418 upazila hospitals and one doctor on roster attends calls. Phone numbers are disseminated through local channels and website.

Training and capacity building of health workforce: A state-of-the-art digital training facility has been created at the health directorate with all modern facilities.

Health promotion and education to community people: A rich indigenous health content is being developed for dissemination among all community clinics and upazila health outlets. m-Health (i.e. mobile-based health systems) tools are also being utilized for health promotion and awareness. Non-government agencies through health workers and information workers (e.g., info-ladies) promote basic health care information targeting prevention and linking with health care institutions in case of need.

Patient management and communication with staff: SMS services are soon to be launched for management of TB patients, queue management, receiving complaints, instructions to health managers and staff, and email and data communication.

Geographic Information System: Health facility information is being recorded on Google maps and is made available online for all locations in the country. The aim of the GIS facility is to also map disease surveillance and health services availability.

Citizens' permanent electronic registry for demographic and health information: This is an initiative that the government aims to complete in 2-3 years beginning from FY 2010-11. Health workers will collect household data using specially designed paper forms or the Geographic Reconnaissance (GR) form with Intelligent Character Recognition (ICR) capabilities for digitization of data. Data entry will be done by ICR machines. The aim is to create a comprehensive national online database with demographic and health record for all citizens of the country.

DEPARTMENT OF FAMILY PLANNING SERVICES

LMIS for the FP services: Monthly supply, distribution and stock balance report of contraceptive items for each Upazila helps in planning and forecasting of inventory. The current web-based LMIS provides alert notification if there is stock below re-order level for all contraceptive and family planning products.

Performance in terms of Contraceptive Acceptance Rate (CAR): A total of 23,500 Family Welfare Volunteers (FWVs)/workers are individually monitored based on their performance. The performance indicator records are digitized and this aides the process of systematic and regular monitoring and follow-up from central management of the field workers.

Video conferencing: The technology is in place for the Director General to meet virtually with the upazila family planning officers through video conferencing. However, existing bandwidth and power supply are still not adequate to enable this tool to be fully utilized.

Death audit report focusing on reducing MMR: The Directorate of Family Planning intends to conduct death audit through verbal autopsy in accordance with the Sri Lanka model. This will provide a data stream for causes of maternal mortality and offer valuable information to take measures against causes that can be avoided.

RESEARCH, SURVEILLANCE AND TRAINING

NIPORT

ICT tools are minimally used in public sector research and training efforts. The National Institute of Population Research and Training (NIPORT) is the key institute for providing population research data and equipping the frontline health workers with necessary skills. Apart from

providing laptops and multimedia equipment to 20 of its regional offices for training purposes, no other intervention has been designed to bring NIPORT under the purview of ICT-based development. While there remains ample scope for creating a centralized health data lab, GIS mapping of where trainings are being conducted, providing remote training facilities with the use of community radio, and many other ICT-based approaches to improve upon the current research and training, the persisting reality is that even the head office suffers from lack of back-up power supply. Lack of opportunities for professional development and skill building and inadequate workforce are persisting challenges for NIPORT.

IEDCR

The Institute of Epidemiology, Disease Control and Research is the national institute for conducting disease surveillance and outbreak investigation. It has been engaged in controlling disease and research activities on diseases with public health implications. IEDCR gathers information by using several ICT tools for its routine disease surveillance and in order to build an early warning system.

One of the Institute's most efficient surveillance activities is the Priority Communicable Disease Surveillance (PCDS), for which data is updated through a web-based software on a weekly basis from 70 terminals throughout the country (64 districts and 6 divisional headquarters). Plans are underway to expand the terminals to the upazila level. At times of outbreak, reports are gathered on a daily basis. Upazila Health & Family Planning Officers (UH&FPO) and Civil Surgeons (CS) are responsible for conducting this surveillance locally. If reports are not sent on time, an auto-generated email alert is sent to Software programs used for this activity are also developed by local resources.

IEDCR has started the recording of any unusual health events from the daily newspaper, television, personal sources in addition to the local health authority. Following such kind of reports, IEDCR requests the local health authority to verify the truth immediately and initiate outbreak investigations from central level, if necessary.

PDA devices are used with high accuracy of data input for the Hospital-based Influenza Surveillance conducted by IEDCR, in collaboration with ICDDR,B. Twelve hospitals (government and private) across the country are currently participating in this surveillance and it is being expanded to 14 additional government hospitals. The objectives were to identify individuals and clusters of people who have life threatening infections with influenza virus and to identify clusters of patients / health care workers / poultry workers with severe acute respiratory illnesses (SARI) and influenza-like-illnesses (ILI). The concerned surveillance physicians, Directors and Superintendants of the hospitals are responsible for sending monthly report according to the case definition of SARI and ILI cases in the prescribed form to the central level. Samples from the sites are collected and tested on a periodic basis. Data from the surveillance are stored and analyzed at the central level. IEDCR is also the National Influenza Centre and it is linked with the Global Influenza Surveillance.

ICDDR,B

In the private sector, the world renowned institution, ICDDR,B is gaining new grounds in surveillance research through innovative and state-of-the-art use of ICT tools. ICDDR,B's surveillance site in Matlab has adopted GIS mapping in 1994. Since then, the GIS unit has expanded to cover the entire country. It provides thematic maps to all relevant projects according to their requirements. The GIS unit subsequently got aggregated with ICDDR,B's Record Keeping System (RKS) and Demographic Surveillance System (DSS) in 1998. Whenever a member gets this DSS identification, it is automatically linked to the corresponding geo-reference objects of the GIS. The spatially related objects are village and bari (cluster of a group of households), and the object types are area and points. ICDDR,B works closely with some of the government initiatives. The Centre works in collaboration with IEDCR and NIPORT on some surveillance efforts. Further collaboration and linkage between the two organizations can offer more efficient and accurate data delivery and can aide important decision making based on reliable epidemiological trends.

EXISTING INITIATIVES

Automation at the Diabetic Association of Bangladesh (BADAS) and BIRDEM: BIRDEM (Bangladesh Institute of Research and Rehabilitation in Diabetes, Endocrine and Metabolic Disorders) has a history of maintaining patient record from its day of inception in 1956. The initial conceptualization of automating key functions, such as personnel, administration, inventory (including store and procurement), and accounts began in 1994. Actual computerization of some of these functions at the Diabetic Association of Bangladesh and BIRDEM began in 2001-2002. Currently, the Personnel Management Information System (PMIS) is in place. Automation has also been incorporated for inventory and accounts management. Laboratory management is also being brought under automation. This will enable direct online transfer of test results to respective doctors for each patient.

Currently a one-stop service facility is being developed in order to provide better patient management and treatment follow up for the Out-patient department (OPD). The OPD automation aims to address management of a large volume of patients with the following services:

- Efficient queue management (includes assigning unique identifiers for new patients through appropriate registration)
- Evaluation of patients for social welfare (includes automation of discount decision and determining appropriate differential fee)
- Nursing service (includes gathering and storing vital health statistics of patients and referral decisions to appropriate physician)
- Laboratory integration (investigation results sent directly to appropriate physician)
- Pharmacy integration (includes proper dispensation of drugs and inventory management)
- Cost-centre analysis (includes overall assessment of finances through integration of all related components)

This automation is aimed to make navigation through the system easier for patients, efficient social welfare service through appropriate determination of differential fee, empowerment of nurses through engaging them in decision making, creating an enabling environment for better accountability, e.g. better transparency in prescription audit. Overall, the aim is to enable the facility to provide comprehensive care – including clinical intervention, drugs, nutrition, lifestyle recommendations, and finance decisions.

Telemedicine Service at Medinova: Medinova Hospital has been operating a telemedicine service since 2007 by connecting patients through video conferencing with physicians in India as follow up of treatment or for assessment of initial in-country diagnosis. All kinds of health conditions are being addressed through this tele-consultation. The aim of the service is to save cost of travel for patients and facilitate international consultation through local resources. It currently costs around Taka 7-8 thousand per consultation, including the remote physician's fee and the price of the technology. While diagnoses of in-country physicians are being assessed through this service, there is scope for capacity building of local specialists through interaction with international specialists. Expenses of this service are still high since it is being provided through private facilities. Costs can be further minimized with participation of public facilities.

Health Hotlines operated by Mobile Phone companies/NGOs: HealthLine, the medical advice and consultation service of GrameenPhone has launched in October, 2007. Apart from the core medical consultation services, the caller of '789' through GrameenPhone will also able to get additional medical information services; they can avail doctor and medical facility information, drug information, interpretation of laboratory test reports and data, and emergency support information as supplementary services. Similar services are offered by BanglaLink and other cell phone operators as well. D.Net, a not-for-profit entity is also offering similar services through its info-ladies for a captive beneficiaries in 23 locations in the country.

Electronic Immunisation Registry and Tracking System in Rajshahi City Corporation: In 2001, a new computerised information system to register, schedule and track immunisation of children was introduced by the Department of Public Health in Rajshahi City Corporation, Bangladesh. On a daily basis, the system used to upload new entries from Rajshahi City Corporation's electronic birth registration system. For each new-born, a schedule of immunization was created and printed, then given to the parents after registration of their baby's birth, attached to the child's birth registration ticket.

From this immunization schedule, parents could be made aware about when they need to take their child to the nearest immunization out-reach centre. The barcode on the schedule can be read at the centre, and health records for the child updated. The main overall rational purpose for the computerized immunization system was to reduce the drop-out rates from vaccination programmes. The specific purposes of the system were to improve the quality of immunization data (e.g. by elimination of duplicate records), and to provide access to that data for health workers to use in their operational work, and for managers and policy-makers to use for health planning. Due to various factors, this system is not currently operational.

Other important initiatives include Remote diagnosis and treatment of breast cancer patients and breast cancer awareness programme by Amader Gram, an NGO working in Bagerhat.

Strengths and Opportunities	Key Challenges and Risks
- There are a few champions in the health system, who are fostering ICT integration in health care system - MIS systems at DG Health and at DG Family Planning are quite well developed - Mobile phone based doctors' consultation at upazilla level has made telemedicine services available from anywhere - 18,000 community clinics have provided the possibility of providing various e-Health services at the local level - The emergence of m-health, i.e. mobile-phone based data collection by community health workers for remote doctors' consultation	- Policy framework for e-Health and m-Health needs to be updated that allows for remote consultation by doctors - Health systems are being developed by different stakeholders – however, absence of interoperability standards pose the risk of data not being integrated for national level strategic planning - Poor marketing of government's tele-consultation services from doctors in Upazilla health complexes

STRATEGIC PRIORITIES

While scope of integration of ICTs is immense and, priorities need to be identified and addressed according to their level of importance in order to achieve this goal. The ultimate goal of integrating ICTs in health or e-Health is to improve health condition of a population by providing good quality, affordable and accessible knowledge, service and care with the use of ICT tools.

GOVERNANCE AND ADMINISTRATIVE PRIORITIES

Vision setting and providing planned direction towards a coordinated goal: The overarching objective of e-Health, as the word itself suggests is to primarily ensure HEALTH with the use of "e" for the majority of the population. With this vision, it is of utmost importance to prioritize the needs of the poor and the disadvantaged, make sure there is minimum wastage of resources. While a number of impressive initiatives are being taken by some departments and institutions, other related departments are lagging behind. A concerted planning to move forward with all the functions of the Health Ministry need to take place for a successful e-Health implementation.

Ministry to play a stewardship role: With the emergence of ICTs in the public and private health sector, the Ministry of Health will assume the role of a steward in order to guide and coordinate efforts in order to maximize resource efficiency. Change of attitude among higher level/mid-senior level managers is necessary in terms of sufficient utilization of ICT tools. A policy may be adopted whereby managers will be mandated to use these tools.

Ensuring better transparency and accountability: One immediate use of ICT will be to inform the citizens the activities of various health departments through their respective websites. Publishing periodic newsletters or bulletins with population and health data, initiatives undertaken for better health service, including an account of public spending by the various directorates/departments will realize the vision of the Right to Information Act 2009 and will also gain greater credibility to the citizens.

Continuity, consistency and compliance: It is of utmost importance to ensure continuity of useful initiatives, such as the Electronic Immunization Registry. Consistency of service in terms of quality and integrity is also necessary for e-Health initiatives to be useful.

HUMAN RESOURCE PRIORITIES & ACCESS TO KNOWLEDGE

Addressing shortage of ICT manpower: The government will focus on creating more trained human resource based on an analysis of which type of skills are necessary. Technical or software development, hardware maintenance, troubleshooting are common skills required for system administrators and there is a serious dearth of this category of staff in the ministry (i.e. the MoHFW) and its subsidiaries.

Monitoring attendance and absenteeism: Absenteeism of medical doctors at service facilities remains an unresolved issue even today. While there are drastic human resource measures to be taken in order to address this problem, a complementing ICT solution can be adopting biometric system similar to what India has implemented in some of its states, including Punjab.

Providing health education to service providers through use of ICT: Use of ICT in medical and health education is common in many parts of the world. Various ICT channels such as VCD/DVD, mobile phones, telecentres will be used for disseminating health education to field level staff.

Maintaining and updating status of training: ICT tools will be used for a continuous maintenance and training of health care service providers. This will act as a planning tool for managers to analyze the demand and supply of the skilled resources.

Addressing shortage of medical and public health instructors: New medical and public health faculty will be trained while existing medical faculty will be connected through various distance learning tools to address the lack of resources in remote medical education facilities.

Extensive capacity building: Training and capacity building of existing human resources in ICT implementation is essential. Field-staff for all departments under the Ministry of Health will be brought under the purview of ICT-based training.

SERVICE PRIORITIES

Telemedicine/Tele-health: Telemedicine is the use of telecommunications to provide medical information and services in a variety of contexts. Almost all specialties of medicine have been found to be conducive to tele-consultation: psychiatry, internal medicine, rehabilitation, cardiology, pediatrics, obstetrics, gynecology and neurology and other diseases. The government will take steps to allow tele-consultation to get access to remote medical advice from doctors based in Dhaka or other national and international locations. Following are areas that can be explored for specific initiatives on telemedicine:

- Utilize opportunities such as the SAARC Telemedicine Network
- Treatment compliance and follow up for conditions such as Tuberculosis and Diabetes
- Proper implementation of following up with pregnant women through mobile communication.

Development of Standard Operating Procedures for clinics and hospitals: One of the longer term goals for efficient operation of e-Health can be ensured by devising Standard Operating Procedures (SOP) for all public and private hospitals. This would enable better exchange of data and services between primary, secondary and tertiary care facilities.

Automated patient management protocol: Patient information and queue management is a necessary tool to bring about discipline and system in large public hospitals such as DMCH, BSMMU, etc. Such systems are already operational in some large private and semi-public institutions like BIRDEM, United Hospital, Square Hospital, Apollo Hospital, etc. The government will automate the internal systems in its public hospitals in a phase-wise approach, starting with in-patients.

Monitoring of availability of essential drugs: Making essential drugs available to the needy is a critical function of the government. The government will develop a strategy to keep an updated database of essential drugs and its distribution. Mobile-phone based tracking system, where citizens can access to information related to availability of free medicine and stock status will be introduced to bring intransparency and ensure proper distribution.

Central database of blood supply sources: Crisis of safe blood supply in times of emergency has been one of the causes of death or delayed care. A central repository of information on availability of different blood groups can be maintained by connecting all the certified blood banks.

Health promotion and health communication: The phenomena of rise in prevalence of chronic diseases and increased awareness on healthy living have re-emphasized the need for health promotion and health communication. Historically, Bangladesh has effectively employed a

number of innovative approaches in using ICT media to disseminate important health and behavioural messages and raise awareness, both in the public and private arena. Lessons from those campaigns will form the foundation for ICT media planning for the future. The government will use various ICT channels for raising awareness about potential health hazards and preventive measures.

Some relevant examples are family planning messages, video clips with first aid and quick response manuals – e.g. what to do in case of snake bite, drowning, burn, etc. that are typical causes of accidents, and also video clips with messages on preventive behaviour, such as what to do to avoid contracting infectious diseases such as swine flu, malaria, tuberculosis, and HIV/AIDS.

Addressing needs of the disabled and marginalized: When a system is designed to meet the needs of the marginalized, disabled and the hard-to-reach population, it automatically covers the needs of the able and privileged population. One of the priorities that will be kept into consideration is design of e-Health systems according to the needs of the most disadvantaged.

Mission mode programmes: The government will undertake mission-mode programmes for specific diseases or specific target groups for achieving certain targets set in MDGs and HSNSP, where ICTs will be integrated for making services reached to the target audiences and ensure complete cycle of being informed up to accessing quality treatment. For example, programme for reducing maternal and neo-natal death as per national and MDG targets.

ACCESS TO HEALTH AND DEMOGRAPHIC INFORMATION

Population data update: Census, birth registration, immunization, and other data on health indicators need to be updated on a more regular basis and the system will be made more efficient through use of ICT tools like hand-held devices with which live update of data, so that some basic information are made available each year automatically, which will facilitate planning of health care intervention accurate and responsive.

Building Electronic Health Record (EHR): The goal of maintaining integrated health record for a patient is to enable care providers to improve their service quality. ICT tools can be most useful in terms of building the platform for creating integrated health record for each unique patient. The government will take steps to develop a system of individual patient health record. Here is an illustration of how Electronic Health Record can facilitate coordinated care for a patient.

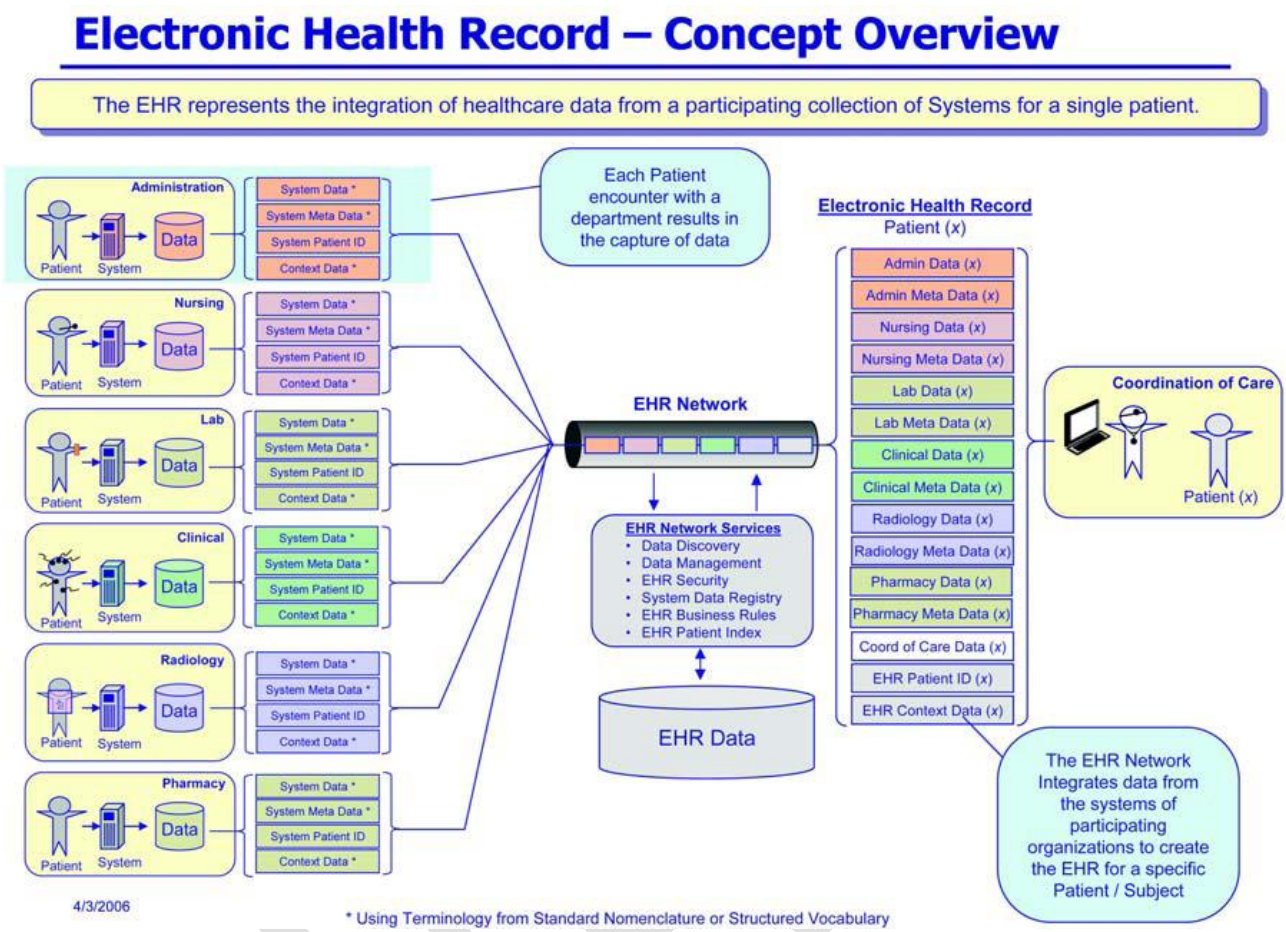


FIGURE 5

Source: "Electronic Health Records Overview", National Institute of Health, National Centre for Research Resources, MITRE Centre for Enterprise Modernization, April 2006.

Proper completion of the GR database: The Geographical Reconnaisance database has the potential to offer guidance to critical decisions for health-related interventions. Proper and accurate compilation of this data is one of the critical priorities for the Ministry.

Online access to research reports: In order to make research and survey reports produced by NIPORT like the Bangladesh Demographic and Health Survey available in the public domain, a bilingual web portal will be developed. For making wider dissemination, appropriate national and international portals will also be contacted.

Cooperation of large health facilities in epidemiological/disease surveillance: A central storage of longitudinal data on population health and disease can offer scope for evidence-based epidemiological forecasting and priority setting for short and long term health interventions. For example, current trend of disease prevalence and live birth rate can inform planning for vaccine requirement for a given population in a given period of time. Through the initiatives of IEDCR, outbreak preparedness and alerting concerned health facilities have been effectively

aided by ICT-based surveillance and outbreak investigation on several occasions (e.g. H1N1 outbreak and Anthrax outbreak in Ghatail). Similar surveillance methods will be used to understand trends of TB, Malaria and other infectious diseases. Involvement and cooperation of large hospitals like DMCH and BSMMU will make the surveillance data more representative and robust, and thereby ensure better efficiency in outbreak response and preparedness.

Health data standardization: With rising trend towards creation of health-related databases, there is an increasingly stronger need towards data standardization so that different health systems can talk to each other seamlessly. Steps will be taken to explore what kind of standardization will be most relevant for Bangladesh while taking into account lessons from other countries.

PARTNERSHIP STRATEGY

The following areas represent possible areas of multi-stakeholder partnership, the stakeholders and their respective roles:

Local Access to Health Information and Services: Three kinds of organizations will be invited to work together to provide local access to health services through ICT systems – 1) those that have ICT facilities at local level such as telecenters; 2) those that have the relevant health content or medical algorithms; 3) those that actually provide various health services directly.

Mobile-based Tele-consultation: Health organizations can also partner up with organizations that provide mobile-phone based teleconsultation services either on the basis of phone calls or data sent from the ground level.

Online or ICT Systems-based Skills Up-gradation for Medical Professionals: Health organizations can also partner up with institutions which provide customized capacity building or training services through ICT-based systems. International programmes in the area of health care promotion will be invited to collaborate with national agencies both in the government and non-government sector. Bi-lateral and multilateral development partners and country government-led initiatives will be approached for contributing in all types of resource mobilization - financial, technical and intellectual. For example, building partnership with Mobiles for Health Initiative of White House will be useful in addressing specific challenges in the areas of maternal and child health care.

INDICATORS MEASURING PROGRESS

Some of the key indicators for marking progress in e-Health are:

- Number of upazilla health complexes providing tele-consultation services
- Number of non-government health organizations delivering tele-consultation services
- Number of community clinics providing tele-consultation services
- Number of government health organizations using ICT-based

2.iii. PRODUCTIVE AGRICULTURE

KEY PROBLEMS	• Agricultural land, water bodies, forest and other resources are shrinking rapidly with a growing population to feed. • Productivity is still low compared to other agriculturally developed countries. Ineffective and inadequate extension service and lack of awareness about agro-processing hinder growth in agri-GDP. • Inefficiency in mismanagement in inputs distribution and farmers' support distribution is a perennial problem for farmers. • Although the coverage of rural finance is extensive, it is still inadequate compared to need. Inefficiency and corruption are still a big issue. • A related long-term challenge for agriculture is global climate change. The preparedness for natural calamities is insufficient.
VISION	All citizen of Bangladesh including disadvantaged groups like women, children, etc. have sustainable access to adequate food and nutrition and farmers derive equitable financial benefit from connected market access.
OUTCOME	Increased efficiency and equity in the crop, fisheries and livestock sector. Exploitation cause by lack of market information reduced. Different ICT channels for rural finance are enabled.

STRATEGIC PRIORITIES

RESEARCH AND DEVELOPMENT

The ministry of agriculture and relevant research and extension institutions in association with institutions abroad will take initiative to create a 'research to use network' where researchers and extension workers will supply tailor made technology information and farmers and other players in the agri-value chain will access them in a seamless fashion using different media (CD-DVD, Internet, mobile phone, radio and television) for application on the ground.

KNOWLEDGE MANAGEMENT

An ICT based surveillance system will be developed to assist farmers with timely and accurate detection, diagnosis, prevention, and control of diseases; manage data of input distribution and subsidy distribution. This system will provide accurate and precise data and information for evaluating impact of policies and programmes for growth and sustainable development of the sector.

EXTENSION SYSTEM

The Ministry of agriculture will equip extension workers with ICTs and/or ICT based extension system so that they can enable the farmers to receive information on new technologies when and where they need it. Mobile phone based applications will be developed and applied for live stock and forestry.

ACCESS TO INFORMATION AND SERVICES

The ministry and relevant research agencies will work together with private sector to develop effective multimedia content for facilitating agricultural extension workers and telecentres so that they can help farmers and women at their door-step with delivery of complex messages.

ACCESS TO MARKET

The Ministry will work with the private sector for developing alternative supply chain and promote fair price for farmers and consumers. Existing intermediaries and telecentres and UISCs as new intermediaries will be integrated in the supply chain. E-commerce for farmers will be promoted for direct trading within country and abroad.

RURAL FINANCE

Bangladesh Bank in association with commercial banks and financial institutions will explore potential for introduction of automated teller machine (ATM), a point-of-sale (POS) device located at a local retail or postal outlets to understand whether it can be a sustainable and affordable alternative to connect rural farmers to formal banking system. Remote mobile loan payments will also be initiated using short message service (SMS), and wireless application protocol (WAP) technologies.

GPS AND RADIO-BASED SYSTEM

The Ministry of Food and Disaster Management will launch experimental initiative to equip sea fishermen with Global Position System (GPS) to find their way when lost due to severe climatic condition. Vessel monitoring system (VMS) will also be introduced to ensure that fishing vessels comply with regulations designed to promote sustainable management and development and thus to protect the livelihoods of local small-scale fishermen.

INTRODUCTION

In 2009, agriculture in Bangladesh accounts for 18.73%[3] of GDP and employs 43.53%[4] of the labour force directly. When forward and backward linkages are taken into account, the agriculture and agribusiness contribution to GDP is estimated at about 35%. Although agriculture used to be originally defined as the cultivation of land for producing crops only, now-a-days, any applied activity through proper utilization of natural resources which relates to the production, development, preservation, processing, marketing and extension of not only crops but also other agricultural commodities such as fish, meat, eggs, forest products, etc. is universally accepted within the purview of agriculture.

Given the total 8.2 million hectares of cultivable lands which is shrinking at the rate of 0.08 million hectors per year and a population that is growing at the rate of 0.2 million every year[5], coping up needs innovative solutions to increase productivity and cropping intensity. Use of mechanized tools is expected to play an important role in this regard which is hindered by lack of access to finance and banking facilities by the farmers.

However, intensifying production comes with a boon-- due to intensive cultivation (200% to 300% Cropping Intensity in 64% of land[6]), river and wind erosion, and improper fertilizers and manurial practices organic matter content of most of the lands is below critical level and most lands are highly deficient in one or several micro nutrients[7]. Intensive research is hence needed to find the right balance in this regard.

A related long-term challenge for agriculture is global climate change. A few degree Celsius rise in Bangladesh's average temperature would make most part of the country unsuitable for production of variety of rice and wheat that is produced locally. Similarly, increased salinity in the south has already renders large tracts of land unsuitable for common crops. Other climate change related challenges such as Sea Level Rise (SLR), frequent floods, riverbank erosion, drought (especially in North West Bangladesh), infestation by newer pest varieties, etc. are affecting the crop sub-sector most. To face this challenge too, Bangladesh need to invest in research and development of new stress resistant variant and undertake urgent programme to disseminate the knowledge and build capacity of the marginal farmers.

Agriculture is also the most labour intensive sector in Bangladesh as well, creating employment for millions of people. Arguably, hence, agriculture is the most suitable way for an over populated Bangladesh to overcome the curse of poverty fast. However, existence of middlemen

[3] Bangladesh Economic Review 2010

[4] Monitoring of Employment Survey 2009

[5] BRRI. 2009. Bangladesh Rice Research Institute, "Extension of Agricultural Machinery at Union Level", A Paper presented from Farm Machinery and Processing Engineering Division of BRRI.

[6] Bangladesh Bureau of Statistics (BBS). 2007. Statistical Yearbook of Bangladesh, 2005

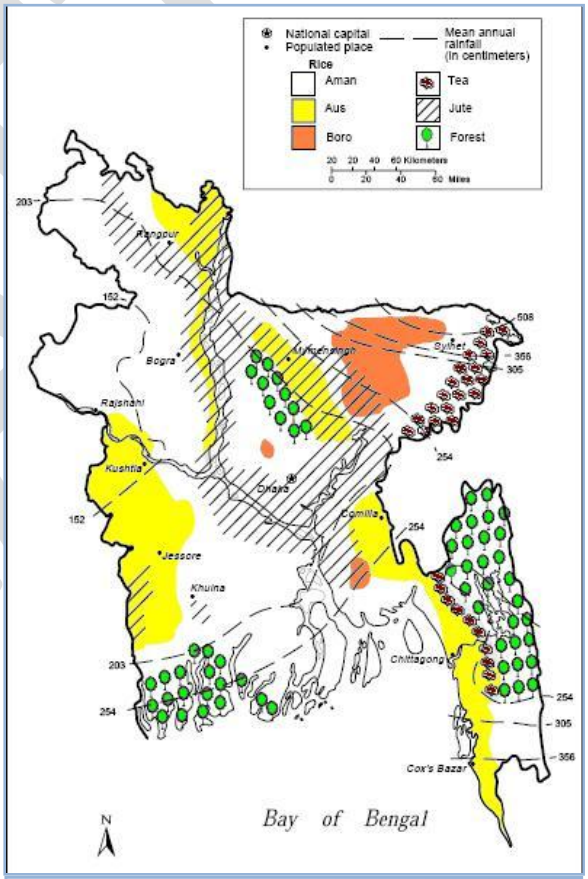
[7] Hossain, Md. Altaf. 2003. Soil Management for Sustainable Agricultural Productivity, published in The Daily Ittefaq, 24 February

who prevents free access to market and free flow of market information presents a considerable challenge in this regard.

A related challenge is posed by the extent of regulatory regime and enforcement of such regimes. The privatization process that started late 90s was successful to meet the increasing demand of inputs and services. However, lack of control mechanism exposed the farmers to the possible exploitation from the private sector who often sales or supplies ineffective, out-dated, and poor quality inputs (seeds, fertilizers, chicks, feeds and vaccines) and ineffective services. Again, lack of information and organization for the farmers put them in the disadvantaged position.

VISION

The overarching goal of the Government of Bangladesh (GoB) matches with Millennium Development Goals (MDG) of achieving 50% reduction in the proportion of population living below the poverty by 2015. According to the National Agriculture Policy, the primary goal is to "modernize and diversify the entire agricultural system, through initiation and implementation of a well-organized and well-coordinated development plan".



Map showing the areas of major agricultural products.
Source: Wikipedia

In subsequent NSAPRS, Agriculture had a dominating place for priority interventions. In the revised NSAPR-II, the key strategic priority for crop sub-sector includes intensification, diversification to high value crops, market based input distribution along with effective monitoring, technology generation and dissemination, demand driven agricultural extension, etc. In the fisheries sub-sector, is to intensification and diversification of aquaculture, promote export, development of marketing infrastructure, etc. For the livestock sub-sector, include diversification, ensuring proper access to market, research and development, etc.[8]

"e-Agriculture" (ই-কৃষি) is an emerging field where Information and Communication technologies or ICTs (Radio, TV, Cell Phone, PDAs, PCs) are playing a vital and catalytic role in addressing key hindrances to the growth of Agriculture such as mismanagement of inputs, inaccessibility to

[8] NSAPR-II (revised): Steps toward change

rural finance, ineffective and inadequate extension service, lack of awareness about agro-processing, and insufficient preparedness for natural calamities, among others.

"All citizen of Bangladesh including disadvantaged groups like women, children, etc. have sustainable access to adequate food and nutrition and farmers derive equitable financial benefit from connected market access".

OUTCOME STATEMENT

Research and extension linkage reached the farmers and production is adequate for meeting demand in basic foods form domestic sources. Farmers are able to access market for getting better price.

SITUATION ANALYSIS

AGRICULTURE IN BANGLADESH

Undeniably Bangladesh has made remarkable progress in agriculture. With 75 million of population in 1971, Bangladesh produced around 10 million tons of food with a shortfall of around 3 million tons. Now, the production has gone up 3 folds, and the population doubled and apparently there is no deficiency. But there is hardly any scope of complacence. Rather a vast array of related challenges needs immediate attention.

Probably, the most important of such challenges has to do with the archaic agricultural extension system. Several factors are responsible. Given that there is 1 field officer for about 3000 farmers for crops extension, the real value of age old field based demo as a tool to disseminate new technology become questionable. The same scenario exists in the veterinary sub-sector too. The ratio of Veterinary Surgeons to farm animals and birds is inadequate and was estimated at 1:1.7 million in 2007 and only 15-20 percent of farm animals received routine vaccination.

SEASON VARIETY	LOCATION	EXPERIMENT STATION	NATIONAL AVERAGE	YIELD GAP
BORO (BR3)	Joydebpur	5.92	4.35	36%
	Comilla	5.62		29%
	Habiganj	5.98		37%
	Barisal	6.1		40%
	Rajshahi	5.37		23%
	Rangpur	6.88		58%
AMAN (BR11)	Joydebpur	6.6	3.21	106%
	Comilla	5.43		69%
	Barisal	5.38		68%
	Rajshahi	4.77		49%
	Rangpur	5.47		70%
AUSH (BR14)	Joydebpur	4.2	2.66	58%
	Comilla	3.9		47%
	Barisal	4		50%

Yield Gap in Rice Production

Additionally, presence of multiple sources of information at the community level especially by the private sector can be misleading and allegedly often serve petty interest of the private businesses.

One of the key indicators of weak extension service is the unusually high degree of yield gap between experimental stations and in the fields of farmers[9] as presented here.

It is also interesting to note that, although rice varieties with yield potential of about 8.6 ton/hector of rough rice under most favourable environment are available, the experimental stations could only achieve, on an average, 6.5 ton/hector in the Boro, 6.0 ton/hector in the Aman, and 4.0 ton/hector in the Aus seasons. While much of such gaps can be explained by annual variations in weather conditions and ability of the variety to withstand a certain amount of pests and diseases pressure, it also indicates limited competencies of the extension officials conducting the experimentation.

With regard to access to market, the spread and influence of middle-man, often forces unorganized and uninformed small hold farmers to sale product at a nominal profit or event at a loss. Moreover, post-harvest handling, packaging, storage and transport facilities for the growers of crops, fisheries and livestock diminish the bargaining power of the grower further. This is especially true for animal based products as those are more perishable.

Another challenging issue is the issue of testing facilities. Specially for animal based products, the ability to trace the product back at various levels, farm, processor, market intermediary, packager and ultimately exporting country is a pre-condition for export—failure of which is already restricting access to foreign market for Bangladesh.

Yet another critical constraint facing farmers and agriculture entrepreneurs is their difficulty in mobilizing finance. Surveys indicate that most enterprises are small-scale and agro-based and half the entrepreneurs identified availability of finance as the most important problem when starting up and during operations. Small-scale agribusinesses constitute a “missing middle” market that is underserved by the commercial banking system and the country’s microfinance NGOs.

Agriculture system is not gender friendly. Not only the women farmers have difficulties in accessing land and finance, they are underserved and unrecognized by the extension system. The various extension services who are mostly men often fail to serve the women farmers. Similarly, agricultural training which is offered during the time when most women are otherwise busy and by mostly men who find it difficult to communicate to the women audience effectively are gender blind too.

[9] BRIDGING THE RICE YIELD GAP IN BANGLADESH - Sheikh A. Sattar, Agronomy Division, Bangladesh Rice Research Institute (BRRI), Gazipur, Bangladesh

Finally, a life-and-death challenge for those involved in small scale fishing in inland or near shore is sudden strike of cyclone or similar natural calamities. Sudden gales, major storms and heavy fog are significant causes of small boat accidents often resulting in capsizing, grounding, becoming lost and collisions. Where weather warning systems and radio communication with fishermen at sea are poor or non-existent, casualties due to bad weather are more frequent. Lack of radio contact essentially precludes efficient search and rescue action.

Use of ICT in Agriculture or e-Agriculture refers to using Information and Communication Technologies (ICTs) such as Computer, Cell Phone, Radio, and TV in the sector to enhance sustainable agricultural development and food security. The concept promotes a multi-stakeholder, people-centric, cross-sectoral platform that brings together all stakeholders, especially farmers and enables them to access timely and relevant information, exchange opinions, experiences, good practices and resources related to agriculture.

Agriculture policies worldwide, including those of our neighbouring countries like Srilanka, India, Indonesia include clearly pronounced ICT policies. Especially for more globally integrated fisheries and livestock sub-sector ICT is considered a critical tool for robust planning and monitoring. In the fisheries sub-sector, new ICTs are being used across from resource assessment, capture or culture to processing and commercialization as well as some specialist applications such as sonar for locating fish. Similarly, ICTs are also being used to enhance the livestock and animal health for expanding the coverage of veterinary extension, capacity development of animal health workers, zoonotic disease surveillance etc.

In light of PRSP and NAP's objectives, e-Agriculture in Bangladesh aims to leverage ICT to:

- Collecting, storing and maintaining data & information to provide farmers with real time information related to integrated crop management, input availability and dosage, irrigation, soil quality, fish culturing, livestock, poultry etc at the community level.
- Strengthen the existing information channels and develop new ones for a demand-driven, decentralized and localized extension program with proper management and efficient delivery.
- Foster market access with necessary information and training to promote, support and enhance rural farm and non-farm enterprises locally and internationally.
- Mobilize finance for rural farmers who are underserved by the commercial banking system and/or the country's microfinance NGOs.
- Build capacity of farmers and extension workers through distance learning and by using local and relevant multimedia content and other means of ICTs.
- Organize/unite farmers nationally to enable exchange of knowledge, information and to ensure their collective voice and participation in policy formulation.
- Recognize and promote women's role in agriculture

E-READINESS

The foundation for leveraging ICTs for agricultural capacity building and marketing had existed for a long time. Long before computers arrived and the cell phones made their way to farmers,

other types of easily accessible ICTs such as community mike, radio and television were leveraged to deliver vital agricultural information. In the recent years, the Ministry of Agriculture and Ministry of Fisheries and Livestock through its various agencies has started harnessing ICTs more effectively to strengthen extension system, perform need-based research and deliver information and services to the farmers. Below are a few of such examples.

AICC and FICC

Agricultural Information and Communication Centres (AICCs) are set up as a common access points in the community for getting livelihood information and services using information and communication technology. Leveraging existing infrastructure of Integrated Pest Management/Integrated Crop Management Clubs, AICCs act as a platform for local public and private organizations to offer coordinated support and service to the agriculture communities in the catchment areas. The members of the club/groups run the centre while Department of Agricultural Extension's field officials and Agricultural Information Service (AIS) officials acts as facilitators

These centres provide livelihood-based information (ICT, print and audio-visual contents) on agriculture, fisheries, poultry and livestock, education, non-farm initiatives, appropriate technology, human rights, employment, disaster management etc. As planned, these centres would be registered by the social welfare department as independent organizations.
The same concept is implemented in 'Fisheries Information and Communication Centres' (FICCs). Fee based extension services providers or 'Local Extension Agent for Fisheries' or LEAFs are now being equipped with ICT equipments and digital content with assistance from UNDP in pilot upazilas. The objective of the pilot is to disseminate information to the LEAF to improve their skills and leverage ICT based interactive content to disseminate new information and techniques among the farmers.
At the macro level, these centres are expected to support and supplement the extension services provided by the field officers.

MOBILE PHONE-BASED SERVICES

With technical support from Agriculture Information Service (AIS), recently one of the private mobile phone operators in Bangladesh launched a call centre service. The service enables the caller to talk to an agricultural expert who answers to queries related to crops, poultry, livestock, fisheries etc. Reportedly, on an average, the centre received 5000 callers per day in 2009.

A Short Message Service (SMS) based gateway is being piloted from May 2009 by FAO Avian Influenza (AI) Unit which enables the subscribers to broadcast alert messages easily. This community based AI monitoring system allows the subscriber to quickly learn about a spread and take precautionary measures as necessary.

AGRICULTURAL TV AND RADIO SHOWS

Making of Maati-o-Manush at Dublar

Mati-o-Manush (Soil and People) is a joint production of Bangladesh TV and Agricultural Information Service (AIS) televised 5 times a week. Department of Fisheries (DoF) also contribute segments of the show. In recent years private TV channels have also stepped forward too. Popular shows like "Shyamol Bangla (Green Bangla)", "Hridoye Mati O Manush (People and Soil at Heart)", "Nodi O Jibon (River and Life)" all focuses on agriculture and agricultural issues.
"Desh Amar Mati Amar", a state-run agriculture radio program, jointly designed with AIS, is broadcasted everyday for 25 minutes. Regional radio stations too air similar programmes in collaboration with respective regional AIS Offices in the local dialects.
Another popular 30 minute program named "Green Hour" is now broadcasted by a F.M Radio channel with technical support form AIS. Work is underway to establish a community radio station in Borguna by AIS with financial assistance of United Nations Food and Agricultural Organization (FAO).

The correspondence segment of the programme is particularly popular. To further enhance this segment, phone-in options are now being gradually introduced to enable the caller to get an immediate response.

WEB-BASED SERVICES

While access to information from web sites especially those developed in English is limited for most farmers, several interesting initiatives were undertaken by the Government which can then be delivered through mobile based channels such as through SMSs.

Department of Agricultural Marketing (DAM) of Ministry of Agriculture website (http://www.dam.gov.bd/jsp/index.jsp), currently piloting web base dissemination of wholesale and retail prices of around 200 commodities from 30 of the 64 districts on the web. In the second phase, the system will collect up-to-date market information fed into a database managed on a SMS Server, which would then be accessible to clients requesting price information for agricultural products via text messaging. The text messages would both request and receive price information in Bangla.

CPMIS, a web based (www.dae.gov.bd) database that stores data on crop production, resource use, input supply, market information, weather etc., was piloted by Department of Agricultural Extension (DAE). The tools expected to benefit the policy makers and researchers. DAE is

currently developing a farmers' database and will have farm level data on farmers available in the near future.
Agriculture Information Service's digital content "e-Krishi" available on www.ais.gov.bd and non-government initiatives like www.jeeon.com.bd, www.ruralinfobd.com are three rich information portals for farmers to be used in telecentres.

GIS BASED SYSTEMS

Under a UNDP supported project and with technical support from United Nations Food and Agriculture Organization (FAO), a national Agro-Ecological Zone (AEZ) database was developed in 1987 by Bangladesh Agricultural Research Council (BARC). The database contains information on land resources including physiographic, soils, climate, hydrology, cropping systems, and crop suitability.

This database later used as the foundation for developing Soil and Land Resource Information System (SOLARIS). The system maps soil data based on classification (Soil Texture, Land type, Land form, Drainage, Slope and Surface Water Recession) and condition (Crop Suitability, Land Zoning, Nutrient Status and Fertilizer Recommendation).

In a recent move, Department of Livestock Services (DLS) with the support from FAO has undertaken a project of geospatial mapping of commercial poultry farms to enable strategic vaccination and disease control more effectively. The database also helps to project production targets.

Other public organizations like Local Government and Engineering Department (LGED), , Bangladesh Meteorological Department (BMD), Water Resources Planning Organization (WARPO) are also leveraging GIS in their planning process.

AGRICULTURAL INPUTS SUPPORT CARD

Recently, Department of Agricultural Extension (DAW) has printed and distributed 18.40 million 'agri-inputs support cards' to the farming community across the country. In 2008-09 financial year, Bangladesh government spent Tk 57.85 billion as farm subsidy. In the present financial year (2009-10) Tk 36.0 billion is budgeted for the same purpose. Primarily the card is going to help target the subsidy more efficiently and accurately. It is expected that the card will also help track farm-level activities and better predict both demand for agricultural inputs and supply of agricultural produce.

Key Strength and Opportunities	Key Challenges and Risks
• High level of political commitment, administrative initiatives and perceived public demand • Vibrant private sector especially in the livestock and fisheries sub-sector and possibility of PPP based partnership	• Various interest groups including the strong middle-men can challenge reform initiatives. • Capacity of field level officials and difficulty in imposing a stricter monitoring regime especially when most of them serve in remote places of the country

• A good range of pilot initiative produced a wide range of lessons. Especially agricultural input card established a means to target individual farms/farmers. • High level of penetration of mobile phones in the hands of population • Most of the interventions will be short term and hence immediate tangible benefits can sustain interest.	

STRATEGIC PRIORITIES

RESEARCH AND DEVELOPMENT

Information and communication technologies (ICTs) are increasingly being used by researchers, teachers, and extension workers to obtain and disseminate information and to communicate with each other, by research managers as tools for data and information management, and by farmers and producers as tools for communication and to gain access to information. The agricultural research organizations in Bangladesh need to learn lessons from countries which face similar challenges and devise a similar framework to ensure best use of ICTs in the area of agricultural research.

Decision Support System in Agro Technology Transfer (DSSAT) or similar software can reduce Scientists' or extension personnel's' workload by using computer generated crop simulation data on crop yield, yield contributing characters, nutrient uptakes etc. Important areas of veterinary research like epidemiology, public health, food safety and diagnostic techniques can also benefit from the use of ICT especially in establishing and expanding the research network with the international community and organizations and bring in latest technologies to improve the sector significantly.

KNOWLEDGE MANAGEMENT

The ability to collect, collate and integrate data through information systems is vital for the development of the sector. Accurate and precise data and information is required for policy development, strategy formulation, monitoring growth and for evaluating impact of policies and programs for growth and sustainable development of the sector.

Especially in the case of zoonotic diseases (transmissible between humans and animals, causing infection in both species), an ICT based surveillance system is needed to assist with timely and accurate detection, diagnosis, prevention, and control of such diseases.

Knowledge bank comprised of items like production/culture/raring technology, breed/variety information, environmental management, production planning & decision support, and

documentaries etc. needs to be developed to ensure proper management of sustainable agricultural practices.

DEVELOPMENT OF A MODERN EXTENSION SYSTEM

Many of agricultural challenges that Bangladesh is facing today has a common solution- to improve the rate of knowledge and technology transfer to the farmers so that newer stress resistant varieties of high yielding crops can be produced in more and more areas.

As already mentioned traditional methods of technology transfer such as demonstration, field days etc. have limited coverage and impact. Extension workers equipped with ICTs and/or ICT based extension system can expand the coverage area tremendously and enable the farmers to receive information on new technologies when and where they need it. Some of the more specific benefits of ICT enabled extension are

- A new range of additional media that can be part of the communication for development "mix" of traditional and/or appropriate media.
- Bottom up articulation and sharing of information on needs and local knowledge;
- Increased efficiency in use of development resources because information is more widely accessible;
- Less duplication of activities
- Rapid speed of communication - locally, nationally and globally
- Reduced communication costs in comparison to other available communication choices

In case of veterinary services too, ICT can be used to substantially overcome the inadequacy of supply which is extended to Upazila centres only. The most obvious application of ICT in veterinary services in Bangladesh can be the use of cell phones. Coupled with a PDA, a cell phone can enable a veterinarian to provide veterinary services remotely and maintain animal records to enable a veterinarian to consult specialists as and when needed. With imaging capacities of WAP cell phones and cheap digital cameras, veterinary consultancy can further be improved. This is a form of veterinary tele-medicine that Bangladesh has not yet leveraged.

The prospect of leveraging call centres at veterinary hospitals and Institutions is also bright to provide the most appropriate solutions and

Cell picture phone based remote

expertise to the farmers Mobile veterinary clinics equipped with latest technologies including X-Ray camera, digital imaging system, fax, printer, scanner, webcam and internet equipped laptops etc. can allow veterinarians to perform almost the entire range of veterinary services and thus expand the coverage area of veterinary extension.

New and emerging technologies such as those involving integrated crop management, improved nutrient balance, and integrated aquaculture techniques are increasingly becoming complex and location specific. Computer based training (CBT), distance learning facilities, multimedia contents, and on-demand consultations based on call centre model can play a very important role to improve the capacity of those professionals working in the field and disseminate these complex techniques and skills more efficiently. Specifically, ICTs can be leveraged to shorten the transmission delay of new technology and skills form the research laboratories to the field officials for ultimate dissemination is the field.

Similarly, to exploit the potential of livestock production by smallholders in Bangladesh and compete in a global market entire livestock system need to innovate and spread these innovations across the commodity chain. ICTs can play an essential role in gluing this innovation system.

DIGITAL CONTENT TO IMPROVE ACCESS TO INFORMATION

Digital content based advocacy, awareness and capacity development programmes can be leveraged even further by utilizing newer channels such as mobile based content deployment to improve the capacity of the farmers. It may be noted that because most farmers are illiterate or only has basic literacy, multi-media content is an effective way to communicate critical and complex messages. ICT can bridge the gender gap and bring the necessary information and services to women at their doorsteps. ICT can also promote women's networks, such as microfinance and livestock development programs, which can be effective advocacy groups for women's rights while strengthening the social capital of women and supporting them in new activities.

ACCESS TO MARKET

ICT can serve to bridge the digital divide and provide relevant business and market information to rural areas to reduce their isolation and foster new income-generating activities in the agribusiness and other non-farm activities by improving communication linkages between growers, processors and retailers for a better transfer of knowledge and technology, developing forecasting of market prices and disseminating prices to producers etc.

Specially, use of ICT to enable foreign buyer to track a animal based product to the farm can facilitate a substantial boost to export. Labelling for quality, food and bio-safety and consumer assurance is emerging as an essential information service for consumers and for participating in global animal products trade. Integration of ICT in livestock production and marketing thus becomes important.

For ensuring better price to farmers in general and small farmers in specific, a new supply chain is possible to build by linking telecentres (UISCs) with national level retailers and exporters. The initiative like Fair Price (www.fairprice.com.bd) can be examined and based on the result such initiatives can be strengthened.

RURAL FINANCE

Figure-print based solar powered rural ATM in India.
Courtesy: Vortex Engineering Ltd.,

ICT innovations such as a personal computer connected to the internet, an automated teller machine (ATM), a point-of-sale (POS) device located at a local retail or postal outlets can be a sustainable and affordable alternative to connect rural farmers to formal banking system. The proliferation of mobile services in Bangladesh has created a unique opportunity to provide financial services over the mobile network (ex: flexi load). Remote mobile loan payments can be initiated using short message service (SMS), and wireless application protocol (WAP) technologies. Payment of electric bill and other utility bills through mobile phone has also opened doors to re-think the current payment system for input level subsidies.

USE OF GPS AND RADIO BASED SYSTEMS

Fishermen can be equipped with Global Position System (GPS) to find their way when lost due to severe climatic condition. Vessel monitoring system (VMS) may also be used to ensure that fishing vessels comply with regulations designed to promote sustainable management and development and thus to protect the livelihoods of local small-scale fishermen. A simple two way radio or even a community radio station in the coastal area can disseminate weather alert in time to the fishermen to save valuable life.

GPS based system linked with satellite can be also used to for fish forecasting and guide fishermen to the spot in sea where the likelihood of higher catch is brighter. To ensure sustainability, this capability coupled with the knowledge oceanographic conditions affecting fishery population and historical catch data can lead towards forecasting of fish populations and thereby help manage the extraction more efficiently.

PARTNERSHIP STRATEGY

Clearly majority of the priority action presented here shall be implemented by Ministry of Agriculture and Ministry of Fisheries and Livestock and the various agencies of these two ministries. It is also clear that many of the services to be provided by the agencies under the two ministries such as call centre, e-centres (AICC and FICC), etc. will have considerable overlapping. Hence, it is important that these agencies coordinate between them. Mobile phone operators and value added service providers are already playing an important role in disseminating agricultural information. This partnership needs to be strengthened and where needed regulated. Inputs like pesticide producers have a stake in making e-Agriculture successful and so have the market agents and wholesale buyers. Like eChoppal service in India, an innovative partnership among these stakeholders can be explored. Banking sector as well as micro-finance institutes needs to play a role in improving access to finance. Similarly, the media, both electronic and print, need to help in popularizing the newer services. Last but not the least, local government institutions need to take leadership role in monitoring the services and its reach as well.

INDICATORS MEASURING PROGRESS

- Yield gap in major crops
- Export of fishers and livestock produce
- Number of on-line consultation and diagnosis for crop, veterinary and aquaculture problems
- Number of days required to disseminate new technology/skills to field
- Number of women directly involved in agriculture

2.iv. JUST JUDICARY

KEY PROBLEMS	• In the civil and criminal justice system, the case management process is excruciatingly slow, costly and time consuming, which restricts access to justice for the poor and the marginalized groups of the society. • There is widespread perception that there is significant scope for improvement with respect to ensuring that the judicial system is fair, particularly for the poor, women and other marginalized groups. • Weaknesses in procedural law, prevalence of vested interest groups, poor training and physical facilities for judges and lawyers, lack of inspection and supervision, intrusion of political considerations, all contribute to such undesirable outcomes.
VISION	A just society by a just judiciary system
OUTCOME	Efficient judicial process where there is no pending cases and justice is not delayed for the citizens, particularly for the poor and marginalized citizens.

STRATEGIC PRIORITIES	**CASE PROCESS MANAGEMENT** To make the process faster and authentic the case management system will be transformed into digital system, starting from filing, recording of presence (hazira) to witness and evidence production. This will automatically generate cause list of the day in the respective court with specified time. Court and other process fees will be paid online after online payment mechanisms are set in place. **RECORD KEEPING AND PROCEEDING** A modern record keeping, filing and keeping case proceedings using ICT based management system will be introduced to strengthen the judiciary governance mechanism. Digitization of current files and introduction of e-filing will be done at the same time. Digitization of current files and introduction of e-filing will be introduced at the same time. Indexation of digitized record will be completed for easy retrieval. Orders and judgments dictated in the courts/ chambers will be signed using digital signature and will be automatically added to the respective e-Case file. **DOCUMENTATION AND REFERENCING** The websites of courts at all levels will be developed which will ideally provide information on: general court information, cause lists, roster, court fees, case status, orders etc. Online forms for application for urgent listing, inspection, process fee, information about certified copies, online filing, web casts and live streaming of certain cases, archived court cases, court functions, swearing in of judges and full court references. All digital data will be archived and will be backed up each day to two different locations in the same jurisdiction and to a third in a relatively disaster-free area saving them from destruction by unforeseen calamities. **LEGAL SERVICES** Case and court procedure related information will be made available online or sent using cellular phone message system for making pleaders more informed. Citizens will be able to monitor the progress without travelling to the court premise. This will also decrease scope of citizens' harassment. Agencies will maintain liaison with the local government institutions to use their information access points as their first face for filing any plea.

INTRODUCTION

Judiciary is considered as a pillar of democracy. Pre-condition for a pro-people judiciary is proper enforcement of legislations maintaining peace, order and effective justice serving forums. Bangladesh's Judiciary went through periods of glory and turbulence. Citizens' perception of rule of law largely depends on how it serves the interest of common people in an impartial manner. Effective functioning of the lower judiciary is dependent upon the authority and integrity of the higher judiciary because the higher judiciary has to play a supervisory role on the lower judiciary.

In the civil and criminal justice system, the case management processes have been excruciatingly slow, costly and time consuming, which restricts access to justice for the poor and the marginalized groups of the society. Another critical problem is the delay in disposal of cases which is highly detrimental to the common citizens. Weaknesses in procedural law, prevalence of vested interest groups, poor training and physical facilities for judges and lawyers, lack of inspection and supervision, intrusion of political considerations, all contribute to such undesirable outcomes. There is widespread perception that there is significant scope for improvement with respect to ensuring that the judicial system is fair, particularly for the poor, women and other marginalized groups.

The judiciary has been separated from the executive wing of the state with effect from November 2007. After the separation of the judiciary from the executive and with the introduction of judicial magistracy, the rate of disposal of criminal cases especially in the courts of magistrates accelerated. However, given the volume of cases pending, such acceleration is not enough. Thus, the second national poverty reduction strategy NSAPR II emphasizes the need for the government to focus on effective service delivery and preparedness for emerging pressure and challenges. There are efforts underway to review judicial reform thoroughly to undertake necessary changes so that it can effectively perform its role as an independent body to safeguard the constitution and protect the individual's rights and liberties.

The government believes that ICT can play an important role for socio-economic development and in view of that, short, mid and long term propositions have been incorporated in the ICT Policy 2009. To create an equitable society (Strategic theme, E1, National ICT Policy 2009, Bangladesh), the government is committed to discouraging and eliminating digital divide of any kind, including in the area of judicial system.

VISION

The goal is to enable citizens with easy access to judicial information and services. Major components reaching the vision are, i) ensuring citizens' easy and affordable access to judicial services; ii) eliminating pending cases through digitalization of case and court management process, iii) improving legal enforcement system through integration of ICTs in all stages of legal process, e.g., digitalization of case record management.

OUTCOME STATEMENT

Efficient judicial process where there is no pending cases and justice is not delayed for the citizens, particularly for the poor and marginalized citizens.

SITUATION ANALYSIS

The process of integration of ICTs in the judicial system has started and some of the actions brought positive results with high potential. On the other hand, there remains immense scope

for further improvement. One of the major reforms aiming improvement in the trial system was introduction of the Speedy Trial Tribunal Act 2002 to deal with some heinous crimes and the Civil Procedure Code (Amendment) Act, 2002 for introducing alternative dispute resolution, establishment of a monitoring cell to monitor violent crimes, establishment of a National Human Rights Commission.

While there are a huge number of cases pending and the rate of filing cases is greater than the rate of disposal indicating increase of caseload every year, it is certain that judiciary will have to bear the huge backlog of cases on its shoulder for an uncertain period of time unless special measures are undertaken to deal with the situation. Backlog of cases does not only delay the disposal of cases and impose huge cost on the justice seeker but also perpetuates tensions among litigants.

The government took up a project known as the "Legal and Judicial Capacity Building Project" to improve the quality and pace of the civil justice delivery system incorporating ICT to reduce backlog; make the system more accessible to the users, particularly, the marginalized and institutionalize the resolution of disputes out of court. These reform initiatives have so far been limited to the Supreme Court and pilot district courts.

The pilot districts have developed a case management and court administration (CMCA) model using ICTs. All complaints and applications are now filed in a single location of the court house to a Judicial Administrative Officer (JAO) and recorded in the computerized modern ICT-based case management system. The pilot Courts have made some progress in creating a climate where people get speedy justice at minimum cost. These reform programmes are expected to be implemented in other districts gradually.

Key Strengths & Opportunities	Key Challenges & Risks
- Government is committed to integrate ICTs for better judicial services - Separated judiciary is the basis to build efficient justice delivery mechanism - Attempt to undertake alternative processes to make it faster, cheap and accessible - Building partnership with local governments and private sector	- Inflexible attitude among court officers, legal practitioners and judges in lower and upper judiciary - Inadequate infrastructure and inadequately skilled human resource at courts - Lack of coordination among different levels of judiciary - Vested interest groups and intermediaries in and around courts

The current court case procedure management system does not comply with the requirement of 21st century. Manual procedural record keeping and storage of case records limit its access and make the overall process slower. It also creates opportunities of misappropriation and rent

seeking. There is also scope for exploitation with the cause list, leaving people vulnerable to unpredictable delays with date of hearing. In the lower courts things are more complex and level of disorder is higher since the issues are more widespread with higher number of court officials and clerks.

Since 2000, several pilot efforts have been undertaken, one of which resulted in creating web sites of the concerned ministry and the Supreme Court. In the Supreme Court's web page options like updated cause list, judgment and relevant laws are incorporated. Some features have not yet been launched. Legislative and Parliamentary Affairs Division of the Ministry of Law, Justice and Parliamentary Affairs provides e-Content on Law, Acts & ordinance on their website. However, these efforts will need regular and proper maintenance along with updated information - otherwise these will not be very useful.

The present court environment is not well acquainted with modern technologies. People engaged with the process are not equipped with tools and do not possess the mindset to apply even if those are available. ICTs are mainly used by a handful of legal practitioners and chambers up to the extent of legal research. The overall process and people engaged still remain largely unaware of the benefits of the incorporation of ICTs.

Few selected judges use and maintain their judgments in PCs, but not in any systematic manner and neither are they accessible by others. Paper-based system, one the one hand, requires more storage space and large number of human resource, and on the other, it is not efficient and eco-friendly.

Attorney General's office is progressively adopting technologies for providing better services to the Government. Since 2009 it has increasingly adopted ICTs for maintaining its records, legal research and developing formats for speedy disposal of matters. Supreme Court is working to publish up to date cause list online. They are also planning to incorporate all proceeding details of each case gradually. Digital Display Board of cases updated on a daily basis in all district courts and divisions of the Supreme Court is soon to come into effect. They are planning to add features like case management and content management systems through a web-based application.

The system, in most cases, remains unclear and gradually they lose hope of getting justice. Introduction of technologies at whatever level available are still inaccessible to them. Although there are some initiatives from the non-government agencies, both non-government and government agencies are failing to improve peoples' access to legal remedies. Legal services can be taken to the grassroots through online and other ICTs. Pleaders can start the preliminary process online. Agencies can maintain liaison with the local government institutions (LGI) to use their information access points (e.g. union information and services centre, UISC or one stop service point at the Upazilla headquarters) as their first face for filing any plea.

STRATEGIC PRIORITIES

It is well understood that change management in the judiciary system will take time due to lack of confidence and 'fear of unknown' among the relevant stakeholders. Thus, the strategic priorities will aim a few actions, which are relatively easier to implement as well as will bring confidence among the stakeholders.

CASE PROCESS MANAGEMENT

One of the strategic priorities will be to introduce ICT-based system of case procedure management, which will make its functions more efficient and increase transparency and accountability. For example, gradual transformation to audio-visual evidence, which can be easily captured, will make the process faster and authentic. Day to day case management system will be transformed into digital system, starting from filing, recording of presence (hazira) to witness and evidence production. Following the case filing system, as foreseen and planned in the higher court, the lower judiciary will also record online the presence of the accused, which will be displayed in the board outside the court room.

This will automatically generate cause list of the day in the respective court with specified time. All proceedings as recorded digitally will be displayed during the argumentation. At the end of every case hearing process, updates and judgment will be recorded digitally. This will save a huge amount of man hour and will make the overall process transparent. Data interoperability between higher and lower courts will be established. Redeployment of existing human resource will create scope for processing more cases and facilitate reducing number of pending cases.

Court and other process fees will be paid online after online payment mechanisms are set in place. In the long run, preparation of e-case filing (e.g. using portfolio format) will be made possible. Other services like summons, notice, warrant will be communicated through e-mails or SMS along with existing communication methods. In places where connectivity will take time, the local post office will serve as the point to receive and deliver these messages. In the courtroom, through a gradual step-by-step process, technologies will be made available to judges, clerks and arguing lawyers with facilities of audio-visuals or oral evidence. Oral depositions will be recorded on audio-video devices supplemented by digital transcription and authenticated by witness and the judge using digital signatures.

DIGITAL RECORD KEEPING AND PROCEEDING

Introducing modern record keeping, filing and keeping case proceedings using ICT based management system will strengthen the judiciary governance mechanism. Digitization of current files and introduction of e-filing will be done at the same time. At the initial stage, proceedings can be kept in softcopy form. Simultaneously older records will be scanned and preserved. Once introduced, all suits can be encouraged to file with soft copies of necessary legal documents. Indexation of digitized record will be completed for easy retrieval. An authentication process will be designed to authenticate digitized records and simultaneous

weeding out of paper records. For Judges, e-Case files will lessen their handling of bulk of paper-documents.

At present, cause lists are generally developed and maintained in hard copies, which leaves scope for manipulation. Gradual shift of online publication and management of cause-lists will decrease level of external interference in the higher court and will help secure clients' interest by keeping the process transparent and fair. A computerized court case recording and tracking system, that makes the information accessible to people through the website, will improve court governance. Digital display board of cases on a daily basis will support legal practitioners to perform their jobs more efficiently. Orders and judgments dictated in the courts/ chambers will be signed using digital signature and will be automatically added to the respective e-Case file.

DIGITAL DOCUMENTATION FOR REFERENCES

The court website will ideally provide information on: general court information, cause lists, roster, court fees, case status, orders and judgments in PDF/digitally signed, online forms for application for urgent listing, inspection, process fee, information about certified copies, online filing, web casts and live streaming of certain cases, archived court cases, court functions, swearing in of judges and full court references.

Reference books, judgments and legislations will be maintained online to ensure easy access of these documents for all related stakeholders. Similarly, Bangladesh Supreme Court Records (BSCR) which contains all noteworthy judgments will be published online by leveraging a search enabled online database. Gradual streamlining of the current administrative procedure will deter arbitrary decision making by court staff. All judgments, some of which are stored in respective Justice's computers, will be put online in a systematic manner.

Case reports that are published by private houses will be coordinated and formalized updating the SC's documentation system. On the whole, there will be integration of the document management system with the case management system. In the court's website a pleader will find e-copies of judgments and the court registry will issue the certified copies digitally.
All digital data will be archived and will be backed up each day to two different locations in the same jurisdiction and to a third in a relatively disaster-free area saving them from destruction by unforeseen calamities.

LEGAL SERVICES

Information about legal services is generally inaccessible at the grassroots level. Most of the marginalized people are not informed of their rights and entitlement to services. Increasingly they are moving away from formal justice mechanism relying more on biased social mitigations. ICTs are yet to be utilized for better access to relevant information and gearing up of the pleading process. Case and court procedure related information, if made available online or sent using cellular phone message system can make pleaders more informed. Citizens will be

able to monitor the progress without travelling to the court premise. This will also decrease scope of citizens' harassment.

PARTNERSHIP STRATEGY

To translate the aforesaid priorities into actions an effective inter-agency coordination plan will be chalked out with clear designated responsibilities. Local government institutions will be an integral part of the process being responsible bridging the services at citizens' doorsteps with their UISCs and other telecentres, one stop points etc.

Development partners e.g. UNDP, European Commission or UK Aid will be invited to be on board to both for innovation experimentation and supporting large scale installation as and where necessary. Telecom companies will be invited to join in with value added services while the ICT industry with domain expertise. Other private sector actors will also join in with innovative options. NGOs, which are working for estqablishing human rights and facilitating access to information on accessing justice will also be encouraged in realising the vision for efficient and quick judicial system.

KEY INDICATORS MEASURING PROGRESS

- Number of cases disposed of where the case process management is digitized
- Number of e-Services that were introduced ensuring citizens access to case related information
- Number of citizens who received all/ some of the above e-Services
- Number of cases of which all documents were recorded and preserved digitally.

2.V. RESPONSIVE LAW ENFORCEMENT

KEY PROBLEMS	• Reliable and 100% high speed and high quality connectivity for the network of law enforcing agencies is still not available for ensuring quick response at any place and any time • Skills of the members of law enforcing agencies are improving but still not spread enough within the system so that overall confidence in ICT use make sure of efficient use of state-of-the art system • Citizens are generally shy off the law enforcing agencies and there is problem of image crisis • Cyber crimes have been added to list of crimes and are getting a threat for safe access to Internet based services and exchange of information and data
VISION	To inoculate high sense of security and rule of law among citizens' through friendly and digital services.
OUTCOME	Rule of law and secured environment is created, where digitized crime data management covering information on crime patterns, criminal records play an important role in serving citizens and making their life more safe and secure.

STRATEGIC PRIORITIES	**CONNECTIVITY** Police is in strong need of secured and dependable connectivity to share/exchange data vertically and horizontally. All district, metropolitan, range and training institutes will be under Wide Area Network. In Metropolitan Police Areas WIMAX based WAN will be established. Primarily, all highway/ range stations and posts may be connected through VPN. The connectivity that links all DCs and UNOs may be extended for Police usage joining all 64 SP office and 600 police stations. **ICT SKILL BUILDING** Constables and all officers from ASI to upward will be gradually provided basic IT literacy. First and foremost, special emphasis will be given on ICT literacy of officers who have direct interface with citizens for various services that can be automated through ICTs. **INFORMATION MANAGEMENT** A uniform system will be developed where all details of the complaint are recorded and for each stage a section is available to put in updated information with investigative officers details, then each step will be recorded - the pleader will also be able to view the progress on line or by a telephone call/ message. Custody records for prisoners held in police stations can be used in preparation of cases for court. Passport verification report can easily be generated using SMS. **CRIME FIGHTING** In house management mechanism with efficient MIS, data analyses tools and other related mechanism with human resource will ensure quality service to citizens. Other in house issues like job performance appraisal, payroll etc. will be made more Crime data management system (CDMS) will be installed in all district and divisional head quarters. **CITIZENS' SERVICES** Citizens' access to police services starting with access to police stations to lodge complaints regarding violation of rights will be strengthened keeping in mind the present need. ICTs will play a significant role to meet these challenges by effective use of cellular telephone, help lines with online options of putting complaints especially in case of emergencies. **CYBER CRIME PREVENTION AND PROCECUTION** The law enforcing agencies will take programmes to enhance their capacity in preventing and prosecuting cyber crimes and protect citizens from breach of privacy, security and fraudulent activities. The Ministry will take a comprehensive programme to protect children from child pornography, women from cyber stalking and youth as a whole from various financial and privacy related crimes.

INTRODUCTION

Law enforcement is an integral component of the justice delivery mechanism. Law enforcing agencies are entrusted with providing services to all citizens and making their lives safe and

secure. According to the Constitution of Bangladesh all citizens are equal before law and as their fundamental rights are entitled to its equal protection (Article 27, 31 Constitution of Bangladesh). This constitutional responsibility of peoples' protection and its enforcement in Bangladesh is entrusted with the police and other related forces. In the second PRS document specifying transformation of roles of law enforcing agencies Government focused on pro-people public services.

The government, in their election manifesto declaring its vision 2021, has committed to assure rule of law and good governance. This is in one of their five major priorities. It pledged to free administration from politicization and transfer to a pro-people state organ. It is categorically mentioned that the police and other law enforcing agencies will be modernized to meet the demands of time. As an important part of modernizing police and their services ICTs were incorporated. In recent years, ICT has become an integral part of their service provision.

Law enforcing agencies in Bangladesh, since their inception, are fulfilling their obligation working with the vision of providing services to all citizens and make Bangladesh a better and safer place to live and work. It has been implementing reforms, providing better services, in the police to ensure safety-security and protection of life to uphold the rule of law.

Government realizes that incidence and severity of crime became a disease thus certain measures were vital to immediately address the problem starting with strengthening law enforcement agencies. It was noticed that an accountable, transparent and efficient police is not only essential for safety and security but also for economic growth.

VISION

In the abovementioned situation the government is working with the vision to transform roles of law enforcing agencies focusing on pro-people public services.

OUTCOME STATEMENT

To reach to the vision the government will be working to enable digitized crime data management covering information on crime patterns, criminal records improving service delivery making citizens life more safe and secure.

SITUATION ANALYSIS

There are four key problems to be addressed which are pertinent to law enforcement system:

- Reliable and 100% high speed and high quality connectivity for the network of law enforcing agencies is still not available for ensuring quick response at any place and any time

- Skills of the members of law enforcing agencies are improving but still not spread enough within the system so that overall confidence in ICT use make sure of efficient use of state-of-the art system

- Citizens are generally shy off the law enforcing agencies and there is problem of image crisis

- Cyber crimes have been added to list of crimes and are getting a threat for safe access to Internet based services and exchange of information and data

The government is taking initiatives that are triggering transformation of roles of law enforcing agencies with respect to increased focus on pro-people public services to ensure safety, security and protection of people. The government at the field level has initiated actions which have brought about positive results with high enthusiasm. Then again, there are colossal opportunities for further upgrading. The goal at this stage is to enable law enforcement agencies ensuring information and services to citizens.

Compared to a lot other organs within the Government, the police have made significant progress in the last five years. Now it has an AIG, designated to manage the overall ICT planning and implementation with the police system. Recognizing the need, the Government undertook a Police Reform Programme (PRP) in 2005, which aimed to improve efficient and effective services in areas of access to justice, investigation and prosecution, human resource management, strategic capacity and communication. In 2007 PRP made a draft proposal to replace the Act of 1861, revised police regulations and introduced gender guidelines. Following are some major areas where significant progresses been achieved.

Bangladesh police initiated an IT (cyber) crime investigation facility with other ICT based interventions. This unit is aimed at preventing cyber crimes and brings criminals under law. They are also using biometrics, a technology which identifies people using physical characteristics such as fingerprints or retinal scans. Fingerprints have been used to identify people for a long time. Until recently they were taken by covering the fingertips with ink and pressing down on paper - now they are scanned electronically. CID already has its project on automated fingerprint identification system (AFIS). With this system, finger print recovered from crime scene can be checked and verified within the criminal database in a fraction of a second.

DNA analysis is another technique which has become very important for identifying both victims and criminals. Some of the police units like SB, CID, and DMP are using some off-the-shelves software like Analyst Note Book for analyzing data and generating visual representation. The Modernization of DMP Control Room project initiated tetra digital tracking communication system with CCTVs and automated vehicle location system to respond quickly in time of emergency. This project also set up digital display boards in Dhaka to inform citizens about the traffic situation.

Criminal intelligence analysis unit (CIAU) is digitally documenting case information in relation with trafficking, murder, forgery and terrorism. Electro static document analyzer (ESDA) enables the police force to analyze handwriting. Sharing BRTA database by Highway police through mobile phone can reduce vehicle theft, forgery of driving license or vehicle registration. This will also help police to give more concentration on real suspects in the street.

In 12 districts, intelligence software modular 3rd Eye is used by SB for passport information verification, security clearance, visa issuance etc. Police has plans to coordinate with the Election Commission to get access to national ID information. The police have made some progress with respect to immigration with its customized database (i.e. Fortrac 3.0) covering more than 92% of the total movement - setting 15 automated immigration check points out of 34. This is linked with BMET also. This is a very important service monitoring citizens' movement preventing illegal migrants.

With the joint effort by MOFA (Ministry of foreign Affairs) and SB (Special Brach) of Bangladesh Police, a virtual connectivity through VPN (Virtual Private Network) will enable the Government to collect on-line visa information of the incoming foreigners. This will also allow visa applicant to submit visa application on-line.

The personnel information management system (PIMS) with officials was introduced in all district units. A pilot project on getting access to updated status of under trial/ investigation through SMS will begin soon. The repeaters installed in districts ensured internal communication faster and effective. An SP from his base can easily communicate with an officer in any remote location. Ration Management Software, Stock and Staff Management Software, Arms & Ammunitions management software, Salary management software etc. are also implemented in some units and are likely to be introduced in the rest of the units.

In the next table it is marked that the government is working to put together required transformations adopting proper ways to recover the present set-up. But barriers like inflexible attitude among law enforcing agency officers added with vested interests of some stakeholders creating difficulties to the progress.

Key Strengths & Opportunities	Key Challenges & Risks
- Government already created a separate cell - Forces are adopting technology quickly - Forces adopt customized technology for better service delivery - Partnership with local governments and private sector	- Attitudinal problem within forces - Forces are focusing only on automation - Lack of coordination among law enforcing agencies - Vested interest groups within agencies

STRATEGIC PRIORITIES

To meet the commitment of making strong and efficient law enforcing agencies, ICTs have the potential of enhancing its capacity. Incorporation of ICT appropriately will not only improve agencies' internal mechanism of management and process but also enhance their capacity for better and effective services. Following are the major areas of possible intervention.

CONNECTIVITY

Police is in strong need of secured and dependable connectivity to share/exchange data vertically and horizontally. Based on the experiences of the first phase of the project on computerization of police stations in 15 districts, the network will be extended to other remaining areas. All district, metropolitan, range and training institutes will be under Wide Area Network. In Metropolitan Police Areas WIMAX based WAN will be established. Primarily, all highway/ range stations and posts may be connected through VPN. The connectivity that links all DCs and UNOs may be extended for Police usage joining all 64 SP office and 600 police stations. A number of distributed software is not functional now only due to absence of connectivity.

BUILDING ICT SKILLS

Police will develop ICT usage understanding and skills of officers of various ranks working in the field. A fair percentage of constables and all officers from ASI to upward will be gradually provided basic IT literacy. First and foremost, special emphasis will be given on ICT literacy of officers who have direct interface with citizens for various services that can be automated through ICTs. First and foremost, the police is going to train and prepare 3000 officers who will be taking active role in implementing vision 2010.

DIGITAL INFORMATION MANAGEMENT

The manual record keeping and management of information makes the emergency-response process slow compared with the need and also creates scope for manipulation. The process of collecting information from police stations is now cumbersome and time consuming. To learn about any filed complaint's progress or other relevant information like status of passport application etc. takes valuable time and resources of citizens. ICTs can play a significant role here. If a uniform system is in place, where in one page all details of the complaint are recorded and for each stage a section is available to put in updated information with investigative officers details, then each step will be recorded - the pleader will also be able to view the progress on line or by a telephone call/ message.

ICT will assist in organizing digital record generation and maintenance. The police will initiate MIS, ICT based data analyses and other related mechanism to ensure quality of service to the people. Innovations like CDMS (Crime Data Management System), PIMS etc. will be gradually implemented throughout the police. This will help in identifying and plotting lines of enquiry, keeping track of vital pieces of evidence and reducing paperwork.

Custody records for prisoners held in police stations can be used in preparation of cases for court. Passport verification report can easily be generated using SMS. Citizens' access to pending status of under-investigation and under-trial case using SMS will be another service improvement. This will make the process easy and client friendly. A criminal justice intranet network can allow the police and other organizations to communicate and share documents securely.

DIGITAL CRIME FIGHTING

In house management mechanism with efficient MIS, data analyses tools and other related mechanism with human resource will ensure quality service to citizens. Other in house issues like job performance appraisal, payroll etc. will be made more efficient with modern ICT tools. Police is in the process of implementing online budget management, digitalized logistics management system, asset /vehicle maintenance, personnel information management, digitalized salary management and distribution tool, automated office file tracking system within its organization.

Successful implementation of all these office tools will add to the managerial and administrative efficiency of the department which in due course will benefit to the public service delivery of the department and ensure the best use of tax-payers money. Police force will use palm prints in addition to fingerprints. Facial recognition systems are becoming important as more evidence is collected on CCTV cameras. Automatic Number Plate Recognition (ANPR) cameras can tell police officers within seconds whether a vehicle has been stolen or is known to be involved in crimes. Through sharing BRTA data, the highway police using ICT based on cellular phone can reduce vehicle theft, forgery of driving license or vehicle registration.

Crime data management system (CDMS) will be installed in all district and divisional head quarters. With the Ministry of Foreign Affairs (MoFA) and the Special Branch (SB), the government is planning to collect online visa information of visitors using virtual private network (VPN). This will be tagged with online visa application option. Radio connectivity among SB, Shahjalal International Airport and central passport office is supporting the airport document analysis centre (DAC) monitoring immigrants' movement.

CITIZEN SERVICES

Citizens' access to police services starting with access to police stations to lodge complaints regarding violation of rights will be strengthened keeping in mind the present need. Present limitations of quality services and emergency responses from the agencies will be resolved. ICTs will play a significant role to meet these challenges by effective use of cellular telephone, help lines with online options of putting complaints especially in case of emergencies. Citizens will get adequate information through websites and when required by telephone call or SMS text and will have a better understanding of the police process.

Through the Access to Police Information (A2PI), the police is planning to allow citizen or victim to get updated status of an under-trial or under-investigation case through mobile SMS. For citizen's better access to police services, the government has introduced online General Diary (GD) entries at "Citizens' Help Request", which will be gradually introduced into various police stations. "Citizens' Help Request" will primarily provide services of GD entry on passport or certificate loss information, on routine information about tenants, on any suspects' movement etc. Police Headquarters is going to introduce soon online provision that will provide legal assistance to expatriates.

Based on the experiences of the first phase of the project on computerization of police stations from 15 districts the network will be extended to other remaining areas with wide area network (WAN). All district, metropolitan, range and training institutes will be under local area network. In metros wi-max based MAN will be established. All highway/ range stations and posts will be connected through VPN.

CYBER CRIME PREVENTION AND PROCECUTION

The law enforcing agencies will take programmes to enhance their capacity in preventing and prosecuting cyber crimes and protect citizens from breach of privacy, security and fraudulent activities. The Ministry will take a comprehensive programme to protect children from child pornography, women from cyber stalking and youth as a whole from various financial and privacy related crimes.

PARTNERSHIP STRATEGY

To implement these priorities into effective applications an effective inter-agency coordination plan will be developed with clear designated responsibilities. Development partners can support both innovation and at macro level interventions. Telecom companies can join in with value added services while the ICT industry with domain expertise. Other private sector actors will also join in with innovative options.
Local government institutions will be an integral part of the process being responsible bridging the services at citizens' doorsteps with their UISCs, one stop points etc.

KEY INDICATORS MEASURING PROGRESS

- Number of police stations where the process management is digitized
- Number of e-Services that were introduced ensuring citizens access to case related information
- Number of citizens who received all/ some of the above e-Services

2.VI. REDUCED ENVIRONMENTAL VULNERABILITY

KEY PROBLEMS	• The forecasting system of flood, drought, river erosion and cyclone is yet to be efficient for evacuation of population and their amenities, particularly poor and marginalized ones and undertaking preventive measures • Insufficient capacity of disaster management agencies of coordination of relief efforts immediately after the disaster • There is a severe problem of identification of victims and proper distribution of relief and rehabilitation support to them • Inadequate resource allocation and effective utilization for post-disaster rehabilitation of affected population and replenishment of resources.
VISION	All citizens of the country irrespective of place of living, whether plain or high land, coastal or inland, are being engaged in joyful economic activities without fear of being affected by natural calamity and subsequent misery.
OUTCOME	The human and natural resources are well protected from natural disasters and climatic changes through a comprehensive and pro-active effort of national and international stakeholders and ICTs are being integrated in that system of protection in an inclusive manner that poor and marginalized communities are not left behind.

STRATEGIC PRIORITIES

REMOTE SENSING AND FORECASTING

Given the increasing frequency of climatic events, initiative to install geostationary satellite will be undertaken to ensure close and constant monitoring of weather patterns to forecast climatic events better. A related priority is to improve internal capacity to analyse satellite data. The government will invest in 'automated weather station', now available at much lower cost than in the past, that measures various weather parameters like river water level, rainfall, precipitation, temperature, humidity, wind speed and direction etc.

EARLY WARNING AND DISASTER RECOVERY

ICT tools like mobile phone, VHV/UHF radio, Broadcast Radio, are common place in Bangladesh. Given its nature, the government will amend related rules so that all cell phone carriers make it a free service for their customers. The mobile communication network will be upgraded to leverage 'location based service' which will enable a message to reach to all phones of a particular geographic location.

SATELLITE-BASED NETWORK

Global positioning system (GPS) technology will be incorporated into the radio receiver set, along with the unique code assigned to every receiver, which will allow hazard warnings to be issued, in text and audio formats, to sets that are within a vulnerable area or just to radio sets with specific assigned codes. Internet and email, particularly using handheld devises like blackberry, will be promoted for the first responders, coordinating bodies or disaster managers.

GIS-BASED MODELLING

Bangladesh is already leveraging Geographical Information System (GIS) based models to predict medium term river erosion months before such erosion actually take place. The immediate priority now is to mainstream the model into development planning so that aversive action can be taken by either training the river or moving out communities from the probably areas of impact to reduce the probability of loss of life and assets.

GREEN ICT

The government will promote green ICT related education, training and skill development to meet demand for environmental skills and expertise at all levels and in all industries. Initiatives will be taken to minimise the environmental impact of ICTs in public administration through green ICT approaches, applications and services through tele-working and videoconferencing to reduce commuting and travelling. The government will undertake initiative to minimise ICT–related disposal through reduce, reuse, and recycle policies.

LEVERAGE COMMUNITY RADIO

Bangladesh government has already granted license to operate community radio to 15 organizations and is in the process of granting more licenses. These radios will play a critical role in broadcasting disaster warning to not only among the community but their signal can also reach out to the fishermen operating in the open water so that they can get back to safety in time. These radios will also play a critical role in disaster recovery.

PREPAREDNESS AND AWARENESS

Community radios, national TV channels and radio channels will be leveraged further and in a systematic way to build awareness among the communities. Possibility of broadcasting local language programme will be explored to improve effectiveness of the communication.

MONITORING AND POST DISASTER RECOVERY

ICT tools like aerial photography will be used to make quick post-disaster assessments of the impact of any disaster to help plan the recovery effort. Proper monitoring mechanism will be deployed to ensure timely and quality data and information flow between source and destination. Damage, Loss and Need Assessment (DLNA) are essential to manage an ongoing disaster.

INTRODUCTION

Bangladesh is one of the most vulnerable countries to climate change[10] because of its disadvantageous geographic location; flat and low-lying topography; high population density; high levels of poverty; reliance of many livelihoods on climate sensitive sectors, particularly agriculture and fisheries[11]. Being the largest delta in the world located at the unique juxtaposition of the composite, sprawling, interlinked Ganges-Brahmaputra-Meghna (GMB) river systems, the second largest river system in the world that drains an area of 1,086,000 square kilometres from China, Nepal, India and Bangladesh, the country is endowed with rich biological diversity, hosting a rich variety of species superbly evolved to populate the ecosystems.

TYPE OF WETLAND	AREA
Rivers	7,497
Estuaries & mangrove swamps	6,102
Beels and haors	1,142
Inundable floodplains	54,866
Kaptai Lake	688
OPEN WATERS	**70,295**
Ponds	1,469
Baors (Oxbow Lakes)	55
Brackish-water farms	1,080
Total	72,899
CLOSED WATER	**75,503**

Types of wetlands and their areas (in sq km)
Source: Akonda 1989 and Khan 1994

Some impacts manifesting in erratic weather patterns and unexpected extreme climatic events is already evident. There were massive floods in 1988, 1995, 1998, 2000, 2004 and 2007. Statistically, the 1988 flood was a hundred-year event, but in 1995 and 2000 the water levels were similar to 1988, and in 2004 they exceeded the 1988 level. Due to the various pressures of a growing population, development interventions, and gaps in policy and legislation and the increased frequency and severity of climatic events, 95% of Bangladesh's natural forests and 50% of its freshwater wetlands are lost or degraded. Impact of cyclone Aila on Sundarbans is an example of such degradation.

RANK	DEATH TOLL	EVENT	LOCATION	DATE
1	500,000	1970 Bhola cyclone	Bangladesh	Nov/1970
2	300,000	1839 Indian cyclone	India	Nov/1839
3	300,000	1737 Calcutta cyclone	India	Oct/1737
4	210,000	Super Typhoon Nina	China	Aug/1975
5	200,000	Backerganj Cyclone of 1876	Bangladesh	Oct/1876
6	146,000	Cyclone Nargis	Myanmar	May/2008
7	138,866	1991 Bangladesh cyclone	Bangladesh	Apr/1991
8	100,000	1882 Bombay cyclone	India	Feb/1905
9	60,000	1922 Swatow Typhoon	China	Aug/1922
9	60,000	1864 Calcutta Cyclone	India	Oct/1864

10 worst cyclones in history 3 affected Bangladesh

[10] United National Development Programme, Country-in-focus: Bangladesh. UNDP RCC web bulletin, 2007(2)

[11] Climate Change Impacts and Responses in Bangladesh, a note for the European Parliament's temporary committee on climate change, Saleemul Huq and Jessica Ayers, International Institute for Environment and Development

The probable mid to long term impacts of global climate change, particularly sea-level rise and the associated impact on ecosystems and economic loss, adds to the already daunting array of environmental issues. By 2050, 70 million people could be affected annually by floods; 8 million by drought; up to 8% of the low-lying lands may become permanently inundated[12]. In addition to direct inundation of a large population, the sea level rise will certainly result in increased frequency and severity of flooding along the major estuarine rivers. Saltwater intrusion problems will also be exacerbated in coastal aquifers.

Climate change is also complicating matters by causing major changes in seasonal and spatial patterns of water availability, raise in average temperature, as well as a deterioration in water quality (through salinization, for example). Each of these changes has catastrophic impact on livelihood of majority of Bangladeshi—44% of who are directly engaged in agriculture[13]. A few degree Celsius increase in average temperature, for example, would make most part of the country unsuitable for production of variety of rice and wheat, the source of staple food for the country.

VISION

In line with the global shift in approach to disaster preparedness, and more specifically with the strategic priorities of the Hyogo Framework for Action (HFA), the stated vision of the Government of Bangladesh is to "reduce the risk of people, especially the poor and the disadvantaged, from the effects of natural, environmental and human induced hazards, to a manageable and acceptable humanitarian level[14]". Bangladesh government has adopted the Bangladesh Climate Change Strategy and Action Plan (BCCSAP) 2009 which is built on six pillars: (i) food security, social protection and health; (ii) comprehensive disaster management; (iii) infrastructure to ensure that existing assets are well maintained and fit-for-purpose and that urgently needed infrastructure is put in place to deal with likely impacts of climate change; (iv) research and knowledge management; (v) mitigation and low carbon development; and (vi) capacity building and institutional strengthening. The Climate Change Action Plan comprises immediate, short, medium, and long term programmes with priority given to the needs of the poor and vulnerable, including women and children, in all activities implemented under the Action Plan.

The linkage between poverty and conservation of natural resources is a mutually reinforcing process. For the purpose, it is important to address issues related to several interlinking factors, such as common property rights; crop, fisheries, forestry, and livestock sustainability; conservation of protected and ecologically critical areas; ecosystem and biodiversity loss; land degradation and river erosion; coastal zone management; drought and floods; and ground

[12] United National Development Programme, Human Development Report 2007/2008, Fighting climate change: Human solidarity in a divided world. Published 2007. New York. USA

[13] Monitoring of Employment Survey 2009

[14] Corporate Plan, A Framework for Action 2005 – 2009, Ministry of Food and Disaster Management, GoB, 2005.

water depletion. There are also issues like illegal and unauthorized hill cutting in greater Chittagong, especially in Rangamati, Bandarban and Khagrachhari[15].

The election manifesto for the ruling Awami League presented before the ninth parliament election presents a clear political vision in this regard. It reads "All measures will be taken to protect Bangladesh-- including planned migration abroad-- from the adverse effects of climate change and global warming. Facing natural calamities, planned reduction of air pollution, prevention of industry and transport related air pollution and disposal of waste in scientific manner will be ensured. Steps will be taken to make Bangladesh an ecologically attractive place through retention of forests and water bodies and prevention of river erosion.[16]"

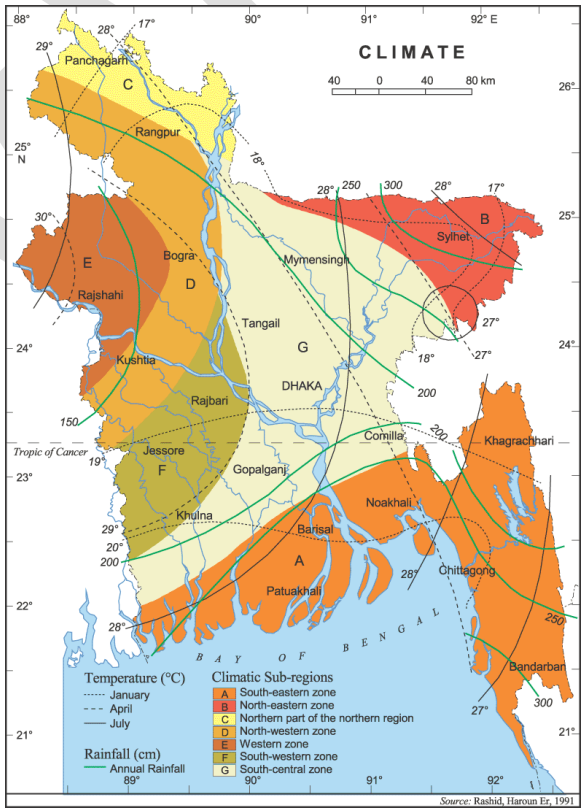
OUTCOME STATEMENT

The human and natural resources are well protected from natural disasters and climatic changes through a comprehensive and pro-active effort of national and international stakeholders and ICTs are being integrated in that system of protection in an inclusive manner that poor and marginalized communities are not left behind.

SITUATION ANALYSIS

CURRENT LANDSCAPE

The state of Bangladesh's environment is already very unhealthy. The major behind such unhealthy state include behavioural and natural causes. Behavioural causes include deforestation; pollution of air, water, and land through deposition of industrial effluents and solid and other wastes; cutting into hillsides; over-fishing; encroachment of rivers causing both pollution and narrowing of streams; conversion of wetlands into lands for agriculture and construction of buildings for various purposes; over-utilization of groundwater causing the water table to decline steeply; illegal occupation of and construction on drainage channels in urban areas; land degradation due to imprudent fertilizers use and widespread monoculture; and population pressure on land and other natural resources. The natural causes of

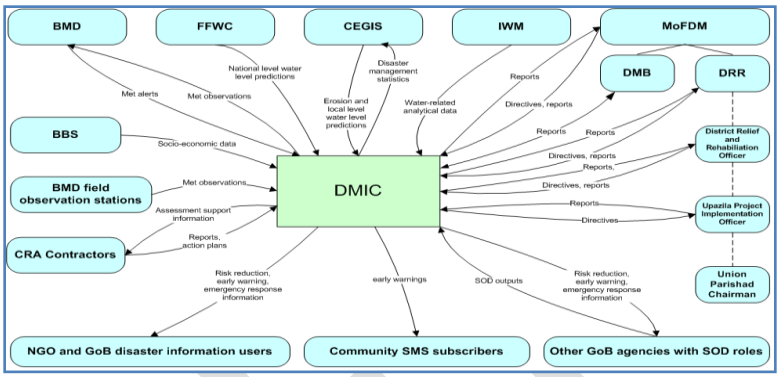


Bangladesh's Climatic sub-regions

[15] Steps Towards Change, National Strategy for Accelerate
[16] A Charter for Change, Page 22

environmental degradation include arsenic contamination of groundwater, floods, river erosion, drought, cyclones and storm surges, and salinity ingress in coastal areas[17]. There is the further challenge of overcoming weak environmental governance. Climate change has compounded problems of environmental degradation and has led to serious deterioration of ecosystems, adding yet another dimension to poverty[18].

This environment-climate-poverty nexus is also demonstrated by a recent study finding which suggests that Bangladesh has the world's highest prevalence of disaster homelessness. Between 1980 and 2000 more than 37 million people in Bangladesh – 30% of the population – were made homeless by disasters[19]. Over 13 million of them were children. With average ground levels in coastal areas as low-lying as 1.5 to 2 metres above sea level and tidal surges reaching up to 6 metres[20], the con-sequences of cyclonic surges are clearly deadly.



DMIC Information Flow

At the same time, aquatic and floodplain ecosystems continue to be severely degraded. The wetland ecosystems have lost connections with larger water bodies (rivers and canals) due to siltation and land filling or draining for agriculture and homestead use. The situation is made complicated by upstream water use in Nepal, India, Bhutan, and Tibet that greatly reduces dry season water flows into Bangladesh. One assessment suggests that more than 50% of seasonal and perennial wetlands have been affected by growing unplanned urban and agricultural land use[21].

The total forest area in Bangladesh was 2.52 million hectares in 2007 according to the Forest Department, though just 2.3% of the area has a very high tree cover (>70%) and roughly 20% has low tree cover (<5%). In general it can be concluded that Bangladesh is not on track to achieve the target of 20% tree cover with density greater than 70%[22].

Amid the above grim picture, Bangladesh is increasingly recognized as a leader in adopting a holistic approach to risk reduction and adoption to disasters. Especially the Cyclone

[17] Draft 'Outline Perspective Plan 2010-2021', General Economics Division, Page 94
[18] Steps Towards Change, National Strategy for Accelerated Poverty Reduction-II (Revised), Page 116
[19] Roy Gilbert. Doing More for Those Made Homeless by Natural Disasters. The World Bank. Disaster Risk Management Working Paper Series No. 1/26182. May 2001. Pages iii
[20] IRIN. Bangladesh. Cyclone-damaged embankments urgently need repair. Naya Para. 7 Dec. 2007.
[21] http://www.usaid.gov/bd/programs/environ.html
[22] Bangladesh MDG Progress Report 2009, General Economics Division, Page 119

Preparedness Programme (CPP) of Bangladesh Red Crescent Society (BDRCS) that came into being in 1972 (officially launched in June 1973) with its stock of 42675 trained and devoted volunteers including 14225 female is an unique disaster warning system operating in the country.

E-READINESS

In the area of disaster management, Bangladesh has already made some significant gain by leveraging ICT. Although the National Disaster Management Policy does not have any separate section on ICT strategy, most entities, however, within the Ministry of Food and Disaster management have their own vision and strategy for ICTs. At the top level, the importance of ICT development is recognized and supported. In the area of environment management, water resource management, air and water pollution, etc. ICT is also being used extensively. The below section highlight some of the ICT based initiatives of various related agencies.

SITUATION MANAGEMENT CENTRE AT DISASTER MANAGEMENT BUREAU

The Disaster Management Information Centre (DMIC) operates 24/7 during emergency period with capability to monitor report and coordinate on emerging events like Cyclone, Flood and Tsunami etc. The DMIC sub centres at all 64 district headquarters and 235 high-risk upazilas have necessary ICT equipment to establish telecommunication linkages for communication and reporting.

The centre is capable of producing daily situation reports, containing updated information on early warning, rainfall and river situation, flood forecast information with 72 hours lead time, 24 hours weather forecast, agro metrological forecast, data on district level damage and loss and emergency response by the government, other national and international organizations.

The centre also host a web portal that enable stakeholders to share, coordinate and disseminate disaster management information, programs and guidelines from various sources to those operating at the ground level. The portal enables DMIC to collect, analyze and disseminate information for risk reduction, emergency response and early recovery purposes. The major functionalities of the portal include but are not limited to early waning for cyclone, flood, information sharing/exchange platform, situation reports, disaster management publications, risk reduction action plans, location based documents, event calendar, contact directory, open source GIS/Map server etc. The users of the portal can customize their service according to their own requirements.

CELL BROADCASTING BASED DISASTER WARNING DISSEMINATION

Disaster Management Bureau started disseminating early warning messages through Cell Broadcasting for cyclone and flood hazard. It is covering the districts of Cox's Bazar and Sirajgonj. With this technology it is possible to send early warning messages to millions of subscribers who are at any given time residing within the catchment area of any forthcoming

disaster such as cyclone within a few seconds. Currently Grameenphone and Teletalk subscribers will get this facility free of charge.

WEB BASED CYCLONE SHELTER INFORMATION

Cyclone Shelter Management Information System (CYSMIS) provides detailed information on a specific cyclone shelter. The system is used by disaster managers as well as the community for planning and safety purposes. An online database has been prepared based on CDMP-I study on Cyclone Shelter Information for Management of Tsunami and Cyclone Preparedness. Cyclone Shelter Management Information System Provides detailed information on a specific cyclone shelter where people take shelter due to disaster threat. This is used by disaster managers as well as by the community for planning and own safely purposes. The database is user friendly and could be accessed here: http://www.cdmp.org.bd/csdb/

COMPUTER BASED MODELLING FOR RIVER-BANK EROSION

UNDP supported Comprehensive Disaster Management Programme of Ministry of Food and Disaster along with Centre for Environmental and Geographic Information Services (CEGIS) has already developed and piloted a computer based simulation model that predicted 49 locations along the Jamuna, the Ganges and the Padma rivers as erosion vulnerable. Initial results show that the model could predict with 70% accuracy.

STRATEGIC PRIORITIES

Disaster management in Bangladesh has gone through a process of significant reforms. To bring this paradigm shift in disaster management from conventional response and relief practice to a more comprehensive risk reduction culture, ICT plays a fundamental role. It can be used intensively in weather forecasting, climate monitoring and predicting, hazard mapping, detecting and mitigating the effects of natural disasters through weather satellites, remote sensing, and telecommunication technologies. ICT based warning system, quick mobilization of volunteers, GIS based forest management and institutional capacities to manage disaster professionally have already reduced death and property damage. Horizontal and vertical institutional linkages by ICT based connectivity to prepare for, cope with, and mitigate the adverse effects of natural disasters is the need of the time.

In this connection, the government has mainstreamed issues of disaster preparedness and management in National ICT Policy 2009. One of the main focuses of this ICT Policy is Environment, Climate and Disaster Management through enhancing the creation and adoption of environment-friendly green technologies, ensuring early warning for vulnerable population, coordination and management of disaster, minimizing disaster response times, biodiversity as well as forest management using remote sensing and GIS technologies, safe disposal of toxic wastes, and enabling effective climate change impact prediction and management programmes[23]. Disaster Risk Reduction has also been incorporated in the first and second

[23] National ICT Policy 2009, section, "Environment, Climate and Disaster Management", p.47

PRSPs. It is also mainstreamed within the different government's policies, development project planning and appraisal process.

ICT is one of the most effective means to facilitate capacity building and institutional strengthening of service providing agencies and stakeholders engaged in different cycles of disaster management. Successful disaster risk management requires the implementation of following four phases of disaster management cycle and in each phase application of ICT plays a critical role:

ICT SOLUTIONS FOR CLIMATE CHANGE, DISASTER MANAGEMENT AND ENVIRONMENT

ICT TO MITIGATE CLIMATE CHANGE

Globally ICT sector is accountable for 2% of CO_2 emission. While one obvious way for ICT to impact climate change is for the industry to work on reducing its carbon footprint, the most effective way is to leverage ICT to reduce the remaining 98% of emission caused by rest of the sectors. Recently Organisation for Economic Co-operation and Development (OECD) countries adopted a set of guidelines for member states to promote green ICTs. Some of these guidelines are clearly less applicable for Bangladesh which only emit 0.3 metric ton per capita. However, a host of others are equally important for Bangladesh as well. Below is the list of guidelines that Bangladesh can adopt[24]:

- Promote green ICT related education, training and skill development to meet demand for environmental skills and expertise at all levels and in all industries and encourage interdisciplinary co–operation in developing green ICT education and training.
- Increase public and consumer awareness of environmental implications of using ICTs and their potential to improve environmental performance and promote widespread development and adoption of clear standards and eco-labels based on life cycle approaches to production, use and disposal of ICT goods and ICT-enabled applications. This includes spreading awareness of the direct effects of ICTs, enabling effects of ICT applications in buildings, transport and energy, and the potential of ICTs to have systemic effects on social and cultural behaviour.
- Minimise the environmental impact of ICTs in public administration through green ICT approaches, applications and services and should maximise resource efficiency of public facilities by using "smart" ICT applications in lighting, heating and cooling, and building control, including enhancing process efficiency and organisational change in public administration through tele-working and videoconferencing to reduce commuting and travelling.
- Minimise ICT–related disposal through reduce, reuse, and recycle policies.
- Take greater account of environmental criteria in public procurement of ICT goods and services and increasing environmental innovation among suppliers. This includes providing an appropriate policy framework that incorporates environmental price and

[24] Recommendation of the Council on Information and Communication Technologies and the Environment, 8 April 2010 - C(2010)61

performance criteria in public procurement, where it is economic to do so, including total life cycle costs of ICT goods and services, and providing information, training and technical assistance to officials in the ICT public procurement and use chain.

ICT AND ENVIRONMENT

The relationship between ICT and the environment is one of the less discussed one. Environmental issues relate to natural resources and their complex dynamics, including water, soil, forests, flora, fauna, climate, and so on, and the world of ICTs is premised on a virtual construct of the world[25].

At the conceptual level environment relates to the profound relationship between matter, nature, and society. ICT revolution, on the other hand, promotes and sustains a new way of living in a more interconnected society that reduces our dependency on matter and affects our relationships with nature[26]. Taking this approach ICT in the environment sector can be used to:

- Communicate environmental knowledge to communities and to facilitate the citizen monitoring of environmental issues and designing response systems to make more efficient use of resources (http://www.wsis.ethz.ch/).
- Reduce the consumption of energy, water and other essential natural resources through more efficient agriculture and industrial procedures
- Play an important role in the fight against pollution—not only by providing more useful metrics and information, but also by enabling population decentralization and large-scale telecommuting
- Provide an ideal platform for local voices to be heard, overcoming physical and social barriers, and for allowing special-interest groups and virtual communities to be formed (http://www.opt-init.org/framework/pages/2.2.5.html).
- Perhaps the most visible area of a positive impact of ICTs on the environment is their potential to reduce consumption of paper through paperless government, paperless office operations (e.g. via electronic document flows, reduced bureaucracy and paper work), networking, and information exchange.
- For researchers, they provide tools that are critical in observation, simulation, and analysis of environmental processes; and for educators, they make learning and teaching more effective, while extending educational resources to a larger community.
- At the individual level, ICTs can be critical in equipping a new generation of people who are more informed, more sensitive, and more involved in the formulation of policies that affect their communities, nations and the world.

[25] Environment and ICT: "enemies or friends"?, Gohar Minasyan, October 13, 2006 (http://www.athgo.org/downloads/position_papers/Minasyan_Gohar.pdf)

[26] Hargroves K. C. and Smith H. (Eds.). (2005). The National Advantage of Nations: Business Opportunities, Innovation and Governance in the 21st Century. Section 3: The regulatory measure response. London: Sterling, VA, (182-188).

IMPROVING REMOTE SENSING AND WEATHER FORECAST

Install a geostationary satellite: Given the increasing frequency of climatic events, there is an immediate need to install a geostationary satellite to ensure close and constant monitoring of weather patterns to forecast climatic events better. For capturing low altitude high-resolution imagery mostly needed to assess damage or impact of any climatic event, Bangladesh may also consider the option of placing a polar satellite in the lower orbit as a joint venture with another country or company.

It is important to note that pre and post disaster images are fundamental input for remote sensing (RS) based 'Damage Loss and Needs Assessment' (DLNA). Due to the high cost of high-resolution imagery, it's not often possible to acquire those images before the disaster, which could be used for post disaster assessment by comparing pre and post disaster imagery using RS tools. Having a shared access to polar satellite would reduce the cost and make such comparison possible.

Additionally, such an investment would reduce the cost of building a weather model for Bangladesh as well as can be used for variety of other strategic use for agencies under Ministry of Agriculture, science and technology, water resources, education, and so on.

Develop capacity to analyse satellite data and forecasting: A related priority is improve internal capacity to analyse satellite data cannot be underestimated. Space Research and Remote Sensing Organization (SPARRSO), the only centre of excellence and national focal point for the peaceful applications of space science, Remote Sensing and Geographic Information System (GIS) urgently need support to improve its capacity and technological upgrade. Tighter linkage with Operational Satellite Applications Programme (UNOSAT) of the United Nations Institute for Training and Research can be established to this end. Especially, better investment in developing a robust model can improve the quality of forecast and help to plan a response to a probable climatic event ahead of time.

ICT Application for Disaster Warning

Source: ICT for Disaster Risk Reduction, UN APCICT

ICT USE	ADVANTAGES	DISADVANTAGES
CELL BROADCASTING	• Not affected by traffic load • Messages can be differentiated by sets of cells. • Authenticity of message.	• Phone must be on. • Phone must be set to receive cell broadcasting.
GIS AND REMOTE SENSING	• Continuous monitoring. • Spatial presentation of data. • Facilitates cooperative effort.	• Need high bandwidth. • Costly hardware and software and require skilled professionals. • Limited capture of qualitative data
INTERNET/ EMAIL	• Interactive. • Multiple sources can be consulted.	• Low penetration rate. • Internet content in local languages may be limited.
MOBILE PHONE/ SMS	• High penetration rate. • Portable. • Relatively low cost.	• Authentication can be problematic • Subject to congestion.
RADIO	• No need to be literate. • Portable and hence women friendly	• Less effective at nigh
SATELLITE COMMUNI-CATIONS	• Independent of terrestrial communication network that can be damaged by natural hazards.	• High cost of systems hardware and bandwidth utilization. • Unlikely to work indoors.
TELEPHONE	• Does not require user to be literate.	• Subject to congestion. • Disasters can damage infrastructure.
TELEVISION	• Does not require user to be literate.	• Less effective at night.

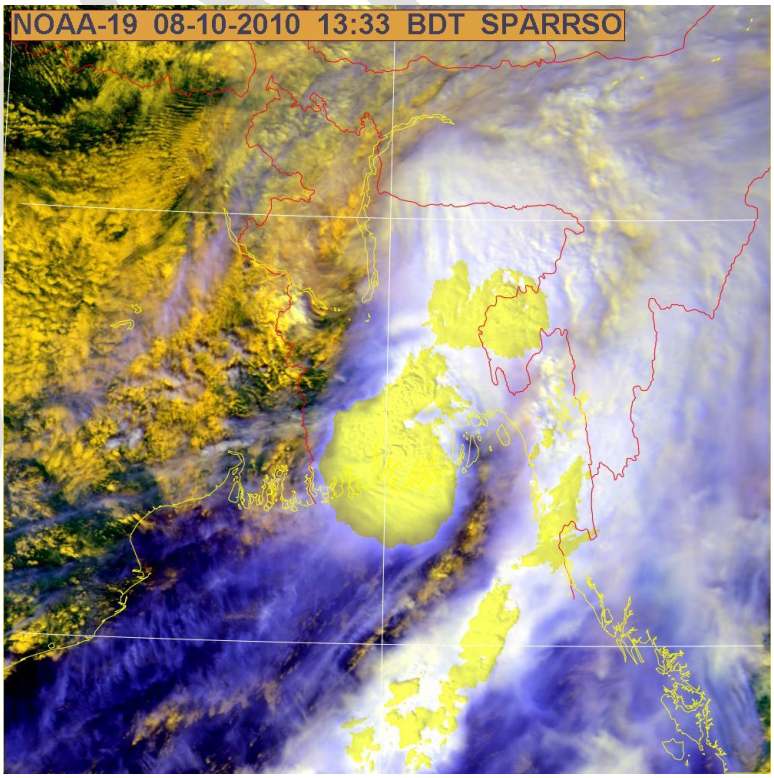
Invest in 'automated weather station': Finally, Bangladesh may invest in 'automated weather station', now available at much lower cost than in the past, that measures various weather parameters like river water level, rainfall, precipitation, temperature, humidity, wind speed and direction etc. These comparatively less expensive devices can be installed is most disaster prone areas under the management of the local university or degree awarding colleges. Such a step would not only improve the quality of localized disaster warning, but also improve the national knowledge base of climatic change and impacts of such change.

EARLY WARNING AND DISASTER RECOVERY

As indicated earlier, various ICT tools like mobile phone, VHV/UHF radio, Broadcast Radio, are common place in Bangladesh. However, much needs to be done in this regard.

Extend cell broadcasting service to all districts: Given the reach of mobile phone in the hand of common men and women in Bangladesh the lowest hanging fruit in this regard is to extend the cell broadcasting service to all districts of Bangladesh. Given its nature, the government may want to amend related rules so that all cell phone carriers make it a free service for their customers. It is understood that a few of them may need to upgrade their network to leverage 'location based service' which enable a message to reach to phone situated in a particular geographic location—but until such upgrading is done, those operators would be required to send related messages to all subscribers and they need to publicly notify in all their advertisement of this particular limitation of their service.

Leverage community radio for early warning dissemination: Bangladesh government has already granted license to operate community radio to 14 organizations and is in the process of granting more licenses. These radios can play a critical role in broadcasting disaster warning to not only among the community but their signal can also reach out to the fishermen operating in the open water so that they can get back to safety in time. These radios can also play a critical role in disaster recovery. Recently, community radio's role in response after the Sichuan earthquake has been well documented. Within three



Satellite Image received by SPARRSO from NOAA-19

minutes after the tremors from the Sichuan earthquake was felt in Chengdu, the capital of Sichuan, the first local radio emergency network was set up. Seventeen minutes later, over 200 stations around Chengdu city had checked in to the emergency network. Upon receiving news that the local government in Hanwang, a town adjacent to the epicentre of the earthquake, had lost all communication means, a team of radio amateur walked from Chengdu to Hanwang to set up a radio repeater and distributed some handheld transceivers. This became the major channel for coordinating local response[27].

Install satellite radio based local network: Much like community radio, satellite radio is being pilot tested for use during emergencies. Bangladesh along with other countries in Asia including India, Indonesia, Sri Lanka and Thailand have tested the Worldspace Addressable Satellite Radios for Emergency Alerting (AREA) system that can issue hazard information directly to communities at risk. Global positioning system (GPS) technology incorporated into the radio receiver set, along with the unique code assigned to every receiver, allows for hazard warnings to be issued, in text and audio formats, to sets that are within a vulnerable area or just to radio sets with specific assigned codes. The cost of an AREA terminal device is under US$80. However, the audio channel is what costs the most. Given this limitation, district and upazila administration can be issued a satellite radio which can be used in cases of total failure of other communication network.

Internet and email, particularly using handheld devises like blackberry, can be promoted for the first responders, coordinating bodies or disaster managers.

PREPAREDNESS AND AWARENESS

Media for disaster awareness: Making the communities aware is the first step in successful disaster management. Community radios, national TV channels and radio channels can be leveraged further and in a systematic way to build awareness among the communities. Experience from around the world shows that capacity development efforts to impart skills as well as infrastructures to increase resilience of communities to deal with disaster events lessen the impact and vulnerability from catastrophic disasters. In this context, of course, community radio has an added advantage to disseminate targeted information considering the most probably disaster that may hit the community and the lifestyle of the community. Additionally, the possibility of broadcasting local language programme would improve effectiveness of the communication. Finally, these programmes are likely to reach more women, who are often more affected than men by natural disasters, than men because of their particularly busy lifestyle.

[27] Chinese Radio Sports Association, "A Report on Amateur Radio Emergency Service in Disasters in China," presented at the International Amateur Radio Union Region 3 Fourteenth Regional Conference in Christchurch, New Zealand, on 12-16 October 2009, http://www.iaru-r3.org/14r3c/docs/020.doc.

Media for environmental awareness: Media can also be leveraged to build community level awareness of the fragile ecosystem among the communities that live within such ecosystem. Targeted programming for local administration, LGI, CBOs, NGOs and community leaders can be broadcasted to improve awareness, political commitments and develop strategy for environmental protection. Programming to introduce best practices in environmental protection and sustainable use of environment form other parts of the country can be focused to offer practical solution to the communities as well. Such programming is expected to bring in positive changes to the behavioural aspects responsible for environmental degradation. Once again, such radio based programming is more likely to reach women better, who has natural instinct of a conserver, because radio broadcasting suites women's busy lifestyle better.

Access to critical data over internet: Currently available geo-databases which are generally kept at the agency that created the data need to be made public so that other agencies, institutions and individual can leverage the data. For example, the earthquake vulnerability micro-zonation database available with the MoFDM showing vulnerable buildings of Dhaka city needs to be made public so that people can take corrective steps to improve the earthquake tolerance of the building.

GIS BASED MODELLING AND MEDIUM/LONG TERM HAZARD FORECASTING

Mainstream river erosion model in national planning: As indicated earlier, Bangladesh is already leveraging Geographical Information System (GIS) based models to predict medium term river erosion months before such erosion actually take place. The immediate priority now is to mainstream the model into development planning so that aversive action can be taken by either training the river or moving out communities from the probably areas of impact to reduce the probability of loss of life and assets. A central coordinating body needs to be formed to monitor and guide all concerned ministries'' and agencies'' activities in those areas of probable impact.

Modelling to predict and manage impact of water pollution: Similarly a medium term model can be prepared to analyze the impact of industrialization, planned or unplanned, on the quality of water both underground and surface. Because water travels long distance and carry pollutants from one place to another, such a model would improve the management of industrialization and water quality.

GIS based topographic modelling to predict impact of sea level rise and siltation: Being an active delta river erosion, sea level rise and siltation plays an intricate role in determining vulnerability of particular geographic locations in the country. Hence, establishment of a GIS based topographic model based on baseline data can be leveraged to determine present and future vulnerability profile of an area. Such model can then be updated from time to time based on regular monitoring. Data and prediction from the model then can be used to design mitigation or adaptation response.

DISASTER MONITORING, ASSESSMENT AND MANAGING POST-DISASTER RECOVERY

ICT tools like aerial photography can be used to make quick post-disaster assessments of the impact of any disaster to help plan the recovery effort. Additionally, the role for ICT tools such as databases (like disaster damage databases, search and rescue databases, disaster management committee databases, disaster management trained/trainers databases, shelters databases), communication equipment etc. provides the vital link between the disaster recovery managers and the disaster affected people to launch any consolidated post-disaster recovery effort. Proper monitoring mechanism should be in place to ensure timely and quality data and information flow between source and destination.

Damage, Loss and Need Assessment (DLNA) are essential to manage an ongoing disaster. Customized software on DLNA can reduce the time and efforts on decision making thus improving the overall efficiently of relief and recovery part.

IMPROVED INTEROPERABILITY AND COORDINATION

Linking Ministries and Agencies: In Bangladesh several ministries and agencies has particular mandate, responsibilities and capabilities that can be harnessed to improve the efficiency of all the agencies. For example, data produced by SPARRSO can be utilized by Ministry of Agriculture to advise farmers on more appropriate timing for conducting various agricultural activities. To achieve such coordination two key preconditions needs to be met. First, digital linkages with various ministries and agencies needs to be created to make sure that the data and analysis done by one agency are shared with others. Additionally, it is imperative to review the operational and decision procedures of the respective agencies to make sure that the analysis are taken into considerations for in decisions taken by the agencies. The second pre-condition would be to ensure interoperability of the various sets of databases that are already in existence. Geographic data stored at DMB, LGED, IWM, GECIS, SPARSSO, etc. along with other databases managed by BBS, Bangladesh Election Commission, etc. needs to be made compatible so that they can be linked to create intelligent reports and analysis.

PARTNERSHIP STRATEGY

Agencies of Ministry of Food and Disaster Management as well as ministry of environment and forest clearly need to take lead in implementing the strategic priorities indicated in this section. However, as indicated, a broad based partnership needs to be forged with several other government and non-government agencies. Partnership with Ministry of Information, Ministry of Science and Technology, Armed Forces Division, Ministry of Water Resources, Ministry of Agriculture, Bangladesh Planning Commission, are but a few public agencies who needs to be linked to take coordinated action to achieve the best utilization of ICT to address the impact of climate change, disaster and environment challenges. Mobile phone operators and private FM and community radio operators need to play a part in the integrated response. Government

needs to bring on board the non government organizations, a natural ally of the government in tackling before, during and post disaster situations.

Citizen reporting systems and mass awareness campaign using ICT tools almost inevitably needs participation of these NGOs who are operating in every corner of Bangladesh. Hence, the equipping these NGOs with ICT based communication tools may be considered as a strategic priority.

Finally, and probably most importantly, partnership with Local Government Institutes (LGIs) is a critical prerequisite for leveraging ICT. Many of the ICT based warning systems can only work if the LGIs take active interest in popularizing them and leveraging such tool themselves.

INDICATORS MEASURING PROGRESS

- Number of successful evacuation after an area is indentified as hot-spot for next erosion
- Number of people who have received early warning through cell broadcasting and community radio
- Number of women who have directly received early warning
- CO_2 emission per capita
- Number of citizen involved in environmental monitoring and reporting using ICT tools

2.VII. EFFECTIVE AND EFFICIENT SOCIAL SECURITY

KEY PROBLEMS	• There is a serious problem in identification, allocation and distribution of benefits for specific beneficiary groups. Resistance, non-cooperation and non-adoption form vested interested groups including disbursement/delivery personnel at different stages • Participation Of citizens and citizens' groups are near to absent in identification of beneficiaries. It is also difficult monitor quality and quantity of distribution by citizens as transparency is not ensured properly. • ICT skills are not adequate among the personnel at the grassroots level which makes difficult to introduce ICT-based SSNP management system. • It is difficult to monitor progress and status of graduation of beneficiaries as data are not available in digital form and they are not interoperable.
VISION	An effective and efficient system of social safety net which delivers fully and timely intended support to all right target audiences among the marginalized population of the country.
OUTCOME	The coverage of social safety-net programmes (SSNP) encompassed the whole marginalized, vulnerable and poor population of the country in a manner that each of them received adequate support to become part of mainstream economic and social activities and by 2021 number of such population reduced to 15% of total population.

STRATEGIC PRIORITIES	• The Cabinet Division will develop a uniform system of identification of beneficiaries of various SSNPs as well as disbursement/distribution methods and coverage, which will be followed by each of the line Ministries for administering own SSNPs. The ministries will coordinate among themselves under the guidance of the cabinet Division to formulate standard operating procedures (SOP) for the targeting of beneficiaries, and capturing their information in the database. • One single entity will be made responsible for identification of beneficiaries of all SSNPs using an ICT-based SSNP management system, where all nodes of SSNP distribution will be linked gradually. The SSNP management system will have interface for each ministry and government agencies for update of information and processing of SSN benefit distribution. This system will be able to avoid multiple-targeting and reduce the time for subsequent beneficiary identification. The central database will be made available readily accessible at the local upazila levels for entering information about new beneficiaries, and also for verifying identify of beneficiaries who are collecting their dues. • For ensuring citizens' right to information and proper distribution of SSN benefits each district portal and subsequently Upazilla and Union Parishad portals will publish list of all eligible candidates for each type of SSNP and also list of beneficiaries who received benefits with month-by-month update. All the lists will bear names of beneficiaries with photograph and other relevant information. Such disclosure of information will facilitate reduction in mis-targeting and involvement of citizens' group for transparency and accountability. The web-portals will have a system of complaints if any irregularities take place. • A system of mobile-phone based payment of benefits will be developed so that target beneficiaries are able to receive payment directly without any other interfaces. For those, who do not have reliable and private access to mobile phone; will receive benefit at their doorstep through postal service system. • As the ICT usage matures and gains maximum coverage throughout the country, plans for automated delivery of cash grants will be considered, as solar-power ATMs can be introduced for expediency in local town centres where the literacy rates make such a programme conceivable. • The ministries and agencies will conduct study to track graduation of beneficiaries or status of beneficiaries for comparison and study of the beneficiaries' condition, and gauge programme success without necessitating field-level review. Field reviews will be undertaken to further verify the information captured in the databases. As the SSNPs are aligned and made uniform with a use of a common ICT framework, more advanced monitoring and impact study can be done with greater ease.

INTRODUCTION

Bangladesh economy has made significant progress in last two decades. Bangladesh has also transformed into a trade dependent nation from an aid dependent one (CPD, 2003).The GDP growth since 2001 was on average at 5% and during last 5 years, the growth of GDP was around 6%. Per capita GNP is USD 700 in 20097-10 (MOF, 2010). During this period, Bangladesh has

experienced reduction in poverty on the one hand, and increase in inequality among rich and poor, on the other. According to HIES 2005, the head-count rate or incidence of poverty using the upper poverty line reduced to 40% (43.8% rural and 28.4% urban). The corresponding rates for HIES-2000 were 48.9% (52.3% rural and 35.2% urban). Poverty gap (depth of poverty) and squared poverty gap (severity of poverty) also declined in 2005 compared with 2000. Using the upper poverty line, the poverty gap was estimated at 9.0% in 2005, recording a 3.8 percentage point reduction over 2000. Similarly the squared poverty gap declined to 2.9% in 2005 from 4.6% in 2000 (BBS, 2006). The Proportion of population below national upper poverty line (2122 kcal) has been reduced to 38.7% in 2009 from 56.6% in 1991. The achievement a per MDG goal is on track and by 2015 the target is to achieve 29% (GOB, 2009)[28].

While poverty was reduced in percentage term, the absolute number of poor population remains a major development challenge for the country. Still 20% of the population are hardcore poor in the country.Creating employment opportunity is the primary objective of all development efforts in the country. However, there is a need for special support to most vulnerable group in the society. The government's poverty reduction strategy emphasizes the need for strong and expanded social safety net programmes to "protect the poor from all sorts of social, economic and natural shocks" (GOB, 2009)[29]. Social safety nets can play an important role in alleviating poverty and in promoting long-term growth by providing impoverished households with the social protection that markets and informal networks are unable supply.

Social safety net programmes (SSNP) are socioeconomic interventions for:

1. the chronic poor (those who are poor even in good or normal times);
2. the transient poor who hover just around the poverty line;
3. other target groups who are in special needs (retrenched workers, river erosion victims, etc).

Currently annual allocation of SSN benefits is equivalent to 2.5% of its GDP (equal to 15% of its annual budget).

The Government's fast-track roadmap for development – the revised PRSP-II – defines social safety nets "to include all kinds of cash and kind transfers to the poor, all welfare activities, unemployment benefits for retrenched workers, subsidized health care, shelters for the homeless, and pension benefits, which prevent individuals from falling into poverty." PRSP-II identifies three key goals of SSNP[30]:

- Safety net interventions will achieve the protection of all types of poor people and the prevention of chronic poverty as well as transient poverty. It will target the extreme poor first;

[28] GOB (2009) The Millennium Development Goals: Bangladesh Progress report 2009. General Economic Division, Planning Commission, Government of People's Republic of Bangladesh

[29] "Steps towards Change: National Strategy for Accelerated Poverty Reduction II (Revised), FY 2009-11, p. 46

[30] Ibid.

- Encourage NGOs, CBOs and the private sector to augment their role and contributions to expand the social safety net; and
- Attempt to increase coverage through increased budgetary allocation each year.

Managing social safety net programmes will remain the key activities of 7 ministries and all local government institutions as a delivery channel for a foreseeable future and there is a need for improving efficiency in its management and also for ensuring 100% outreach to genuine beneficiaries. Resource allocation for social safety net is still not adequate, as a result efficient management has become more important to satisfy the needs of the most vulnerable population. Thus, one related issue is to identify right beneficiary and ensure full and timely delivery of the benefits.

The Digital Bangladesh agenda is not an elitist agenda. Thus, priority of the government is to ensure integration of ICTs in the areas, where it can maximize benefit to the poor and all marginalized segments of the population.

VISION

The vision of SSNP includes three important elements:

a. Increased coverage of the SSNP for all eligible population

b. Improved efficiency in identification of beneficiaries

c. Improved delivery mechanism for ensuring full and timely delivery of the SSN benefits.

"An effective and efficient system of social safety net which delivers fully and timely intended support to all right target audiences among the marginalized population of the country".

OUCOME STATEMENT

The coverage of SSNP encompassed the whole marginalized, vulnerable and poor population of the country in a manner that each of them received adequate support to become part of mainstream economic and social activities and by 2021 number of such population reduced to 15% of total population.

SITUATION ANALYSIS

Involvement of Multiple Agencies: The current situation of social safety net programming shows that it is undertaken by more than seven entities including the Ministry of Social Welfare (MOSW), Ministry of Food and Disaster Management (MOFDM), Ministry of Women and Children's Affairs (MOWCA), Ministry of Liberation War Affairs (MOLWA), Ministry of Primary

and Mass Education (MOPMA), Ministry of Health and Family Welfare (MOHFW), and the Ministry of Establishment (MoE). There are close to 50 different social safety net services under these ministries. SSNPs are therefore characterized by a diversity that makes it challenging to treat under one umbrella definition, however as all social safety nets are intended to ensure social protection for the vulnerable they share many criteria of programme design such as establishing the beneficiary selection criteria, identifying the geographic or socioeconomic coverage, and distributing entitlement 'packages'.

Currently there exists no comprehensive list of beneficiaries, and each agency is applying their selection criteria in the most expedient manner available – some identify beneficiaries through their own PIO, some may use the lists of vulnerable groups targeted by UN bodies, while others rely on the discretion of the UP or pourashabha representatives.

Development partners, NGOs, implementing agencies identified coordination is a problem as SSNPs are administered by different ministries, and each office has its own modus operandi with respect to targeting the beneficiaries, disbursing the benefits, and conducting programme monitoring and impact study. However, the importance of coordination lies in identification of beneficiaries from a common database. Statistics Division is working to develop a National Population Register (NPR), which might be helpful for identification of beneficiaries and avoiding overlapping.

Top-down Process: Currently, the delivery process of SSN benefit is pre-dominantly top-down. As a result, it faces challenge to reach beneficiaries in remote locations around the country. The number of beneficiaries, types of benefit, value of benefit, delivery system are decided from the top and relevant institutions within government and from NGOs are not engaged adequately. As a result, the benefits influence the lives of the beneficiaries in a way, which not always make sense in terms of transformation from ultra poor status. Depending on the geographic penetration of an SSNP, beneficiaries are identified by Project Implementation Officers (PIO) of the concerned government authority, upazila level officials, Union Parishad (UP) or pourashabha representatives. Sometimes a centralized list of vulnerable areas is the sole basis of allocation of benefits, and individual or family identification is not undertaken.

Information Management: The process of benefits disbursement is varied – at higher levels of the local government structure cash benefits is distributed through public banks while in-kind assistance is distributed at the UP or pourashabha level. In some cases, beneficiary selection data is not stored in databases (either electronic or hard copy) and the information is deleted at the end of the fiscal year, making it virtually impossible to monitor programme impact. The use of ICT can significantly lower the administration costs of all social safety net programmes, thereby allowing more sophisticated methods of data capture and storage, in addition to more advanced capacity for post-programme evaluation. As social safety nets require managing large volumes of relatively-uncomplicated data, introducing a uniform ICT solution for all of them would be our goal.

Readiness: Following the adoption of the ICT 2009 policy by the government, there has been a lot of movement on the part of the Ministries and government bodies that provide citizen services, to take steps towards adopting technology and use computing tools on a more regular basis, especially in conducting formal government business. Despite challenges in power availability and lack of formal ICT training for staff at all levels, government officials at the higher levels are using computers for email and internet services as well as word processing for communications and directives. While some of the Directorates surveyed admitted that their offices in the rural areas are not yet responsive to email communications, many acknowledged the benefits of speed and efficiency when ICT is used for business. They acknowledge that introducing ICT can make the targeting of beneficiaries and disbursing the benefits much more effective and transparent, however they do not have plans that can be realized at the national level.

Some Directorates providing social protection collect beneficiary data at the field level and maintain excel format databases at the central level. However, the databases are not networked and cannot be used for operational activities yet, even with the Directorates' own PIOs. Therefore the large amount of effort and expenditure going into this activity is not translating to any functional advantages in service delivery.

One aspect of automation exists in the 'poverty index/ poverty map' that has been created by the World Food Programme (WFP) which is already being used by Ministry of Food and Disaster Management. Use of this index is a real example of technology facilitating the targeting of poor and vulnerable areas where numbers of hardcore poor are highly concentrated. Tools such as these would be well-utilized if ICT is introduced in SSNPs, while at the same time monitoring data can be plugged back in to create other such indices.

The Ministry of Agriculture distributed "Krishi Card" for disbursement of agricultural input subsidy, which worked well and the benefit went to actual beneficiaries in most of the cases.

Monitoring and Evaluation: A critical component of SSNP delivery is the subsequent assessment of the impact of the benefits distributed on the condition of the recipients. Currently, there is no way to do that as the effect of a single SSNP cannot be studied in isolation from the others; programmes are administered in a piecemeal manner and information on the quantity and actual time of disbursement is not captured for further evaluation. It is not useful to study the effect of one SSNP when its delivery is not regularized, or it is interspersed with other assistance.

Key Strength and Opportunities	Key Challenges and Risks
• Strong commitment of the ministries and agencies for ensuring appropriate delivery of benefits • Some examples of using ICTs in managing distribution of benefits	• Creating a common format for identification, allocation and distribution of benefits • Resistance, non-cooperation and non-adoption form vested interested groups including

have already been created • Private sector and NGOs are willing to take part in creating on-line and mobile-phone based services for accessing social safety net benefits • All local government institutions are connected through launching of UISCs and Upazilla Community e-Centres • National Population Register is on the card, which will be helpful for identification of beneficiaries and avoiding overlapping.	disbursement/delivery personnel at different stages • ICT skills are not adequate among the personnel at the grassroots level

STRATEGIC PRIORITIES

The Cabinet Division will develop a uniform system of identification of beneficiaries of various SSNPs as well as disbursement/distribution methods and coverage, which will be followed by each of the line Ministries for administering own SSNPs. The ministries will coordinate among themselves under the guidance of the cabinet Division to formulate standard operating procedures (SOP) for the targeting of beneficiaries, and capturing their information in the database.

One single entity will be made responsible for identification of beneficiaries of all SSNPs using an ICT-based SSNP management system, where all nodes of SSNP distribution will be linked gradually. The SSNP management system will have interface for each ministry and government agencies for update of information and processing of SSN benefit distibution. Design and maintenance of the central database of beneficiaries will ensure that identified beneficiaries cannot be shuffled at will, and wrongful enrolment of an individual in multiple programmes can be easily highlighted and addressed. The database will offer further advantages when biometrics (fingerprint, eye scan, etc) of the enrolled beneficiaries can be captured alongside their personal information; this will enable a system of cross-checking at the time of benefit disbursement. Once an individual is identified as a vulnerable by one agency and is issued a 'benefits ID card', they will not need to be registered in the database again even if they are eligible for other assistance. This system will thereby be able to avoid multiple-targeting and reduce the time for subsequent beneficiary identification. As each national ID would only be linked to one 'benefits ID card', misappropriation can also be minimized. The central database will be made available readily accessible at the local upazila levels for entering information about new beneficiaries, and also for verifying identitfy of beneficiaries who are collecting their dues.

For ensuring citizens' right to information and proper distribution of SSN benefits each district portal and subsequently Upazilla and Union Parishad portals will publish list of all eligible candidates for each type of SSNP and also list of beneficiaries who received benefits with

month-by-month update. All the lists will bear names of beneficiaries with photograph and other relevant information. Such disclosure of information will facilitate reduction in mis-targeting and involvement of citizens' group for transparency and accountability. The web-portals will have a system of complaints if any irregularities take place.

A system of mobile-phone based payment of benefits will be developed so that target beneficiaries are able to receive payment directly without any other interfaces. For those, who do not have reliable and private access to mobile phone; will receive benefit at their doorstep through postal service system.

As the ICT usage matures and gains maximum coverage throughout the country, plans for automated delivery of cash grants will be considered, as solar-power ATMs canbe introduced for expediency in local town centres where the literacy rates make such a programme conceivable.

The ministries and agencies will conduct study to track graduation of beneficiaries or status of beneficiaries for comparison and study of the beneficiaries' condition, and gauge programme success without necessitating field-level review. Field reviews can will be undertaken to further verify the information captured in the databases. As the SSNPs are aligned and made uniform with a use of a common ICT framework, more advanced monitoring and impact study can be done with greater ease.

PARTNERSHIP STRATEGY

The development partners can play an important role in creating country wide database of vulnerable and marginalized population under the NPR as mentioned above, which can be accessible to the relevant agencies from any place. The NGOs and telecentres can play role in updating the database and play an important role in disseminating information about eligibility and allocation of benefits among geographic locations, which are not always available through local government offices.

INDICATORS MEASURING PROGRESS

- NPR created and actual number of vulnerable and marginalized population is identified by category.
- Level of match between vulnerable population database and actual beneficiaries of SSN programmes.
- Share of graduation of beneficiaries from vulnerable groups to mainstreamed population

2.VIII. HASSLE-FREE LAND MANAGEMENT

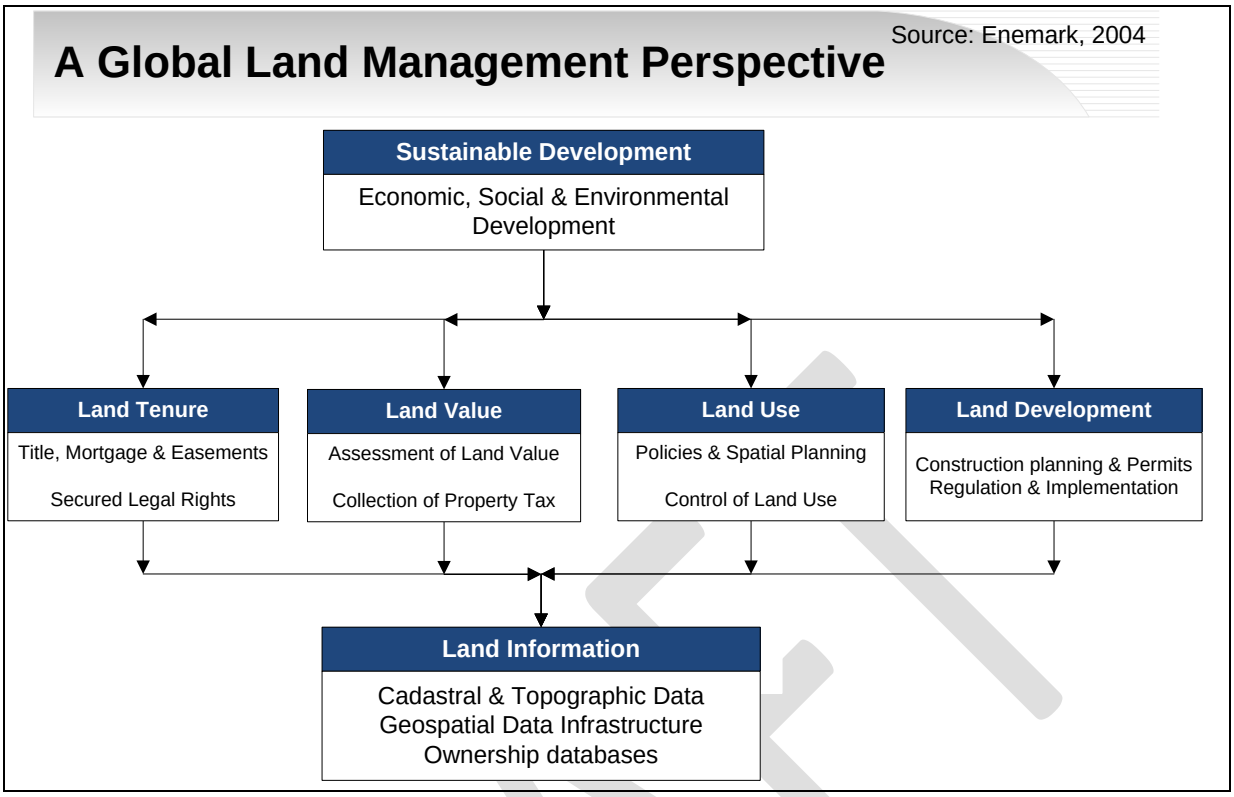
KEY PROBLEMS	• Enforcing land acquisition ceiling and preventing anonymous transactions are difficult • One-fourth of all land records are disputed, resulting in nearly 3.2 million pending litigations involving around 150 million people; each dispute takes an average of 9.5 years to resolve • Nearly 1.3 million hectares of public land is now illegally occupied • Manual system of holding tax management is inefficient • Available data related with land and land management is inadequate and often contradictory • Years of unorganised land sale, revenue, survey and mutation records create serious difficulties for planned land development.
VISION	A set of new policies related to land administration and land use highlighting appropriate integration of ICTs for ensuring better access to land records and bring about transparency and accountability in land transactions as well as better access to khas land by poor and community groups.
OUTCOME	The reform ensured public access to land records, transparent land transactions and efficient collection of land revenue through modernization of all land records. Socially justified and transparent land revenue imposition and collection system is in place for both the government and citizens. Marginalised citizens established their legal right on khas land through transparent distribution mechanism.

STRATEGIC PRIORITIES	
	CONSOLIDATION Lessons learnt from various pilot interventions seem to be conflicting at the first glance. The relevant authorities will conduct further investigations to sift through the evidences taking into considerations the latest technological advances and develop a new set of policies for proper land administration and land use. A review process will be initiated to consider- how the stakeholders of those policies and legal framework may be brought on board. A high-powered independent body will be established to give recommendations for next steps based on such a review and through a consultative and inclusive process. **QUICK-WINS** A few 'Quick-win' projects will be implemented in the land sector which would not only bring in tangible change in overall land management but also will help the consolidation process by supplying it specific case studies and responses from the ground e.g. on public land management, revenue collection and digital land zoning system. **CAPACITY DEVELOPMENT** The present manual system of land-management and the proposed ICT based management represent distinctively different cultural context. Hence, efforts will be undertaken to gradually transform the work culture of relevant agencies. To this end, modern technology will be introduced to support improved work-processes of the relevant agencies. Additionally, skill-training programme for the management of these agencies to build leadership skills such as negotiation skills, communication skills etc. will be organized.

INTRODUCTION

Land, as a resource, is the foundation of any country's economic development, and it is directly linked to national income. It is not a coincidence that all the leading economies of the world have in place well-functioning and reliable land administration systems.

Good governance and effective public administration recognize land as the principal source of wealth and indeed wealth generation in a society. Land administration systems are the basis for conceptualizing rights, restrictions and responsibilities related to land and property. Property rights are normally concerned with ownership and tenure whereas restrictions usually control use and activities on land. Responsibilities relate more to a social, ethical commitment or attitude to environmental sustainability and good husbandry. In more generic terms, land administration is about managing the relations between people, policies and places in support of sustainability and the global agenda set by the MDGs.



Good land management system needs a reliable land information system to ensure social justice, economic growth, and environmental sustainability and to ultimately sustainable development of a country. In other words, absence of such a system i) spreads tension, sustains and fuels corruption, affects social cohesion negatively and ultimately plagues the justice and human security apparatuses in the country; ii) because by nature land ownership is governed by complicated legal framework, any uncertainty makes the poor and less literate segments vulnerable to frauds by well-to-do segments that artificially drives down the cost of farm land; and finally iii) uncertainty related with ownership induces sub-optimal and unsustainable short term use rather than long term utilization of the resource. A non-reliable and non-transparent land ownership management system, hence, effectively slow down the economic growth of the country, destabilizes the society and promotes inequity and injustice.

As shown in the diagram above, all four aspects of land management i.e., land tenure, land value, land use, and land development directly influences country's development, social justice and sustainability. For example, land valuation is the basis for land revenue, an important source of public revenue. If the system is not efficient and effective then the i) government would get lot less revenue than they should get and ii) owners who own large tract of lands would find themselves in a better position to leverage any existing corrupt practices to avoid payment of land revenue would be better off than small land holder from corrupt practices of land tax officials.

Similarly, land rights that provide secure tenure and facilitate broad private ownership enable society to develop dynamic land trading practices and formation of land markets. The lack of

land rights has implications for a variety of other rights including the right to occupy a house or rent, the right to sell property or land, the right to vote, the right to access water and sanitation, the right to other services such as education, health and the right to law and order. Insecure land tenure or the lack of land ownership also restricts the farmers' access to credit that are required for improved land practices. Land tenure and property rights affect the application of technologies for agricultural and natural resource management. Secured property rights give sufficient incentives to the farmers to increase their efficiencies in terms of productivity and ensure environmental sustainability and thus the land tenure plays one of the vital roles in shaping farmers' land-use decisions.

As reflected in the National Poverty Reduction Strategy Paper (NPRSP), there has been a growing realization that the critical policy issues pertaining to land have to do with land administration reform and a rational land use policy including ensuring better access to khas land by poor and community groups. In order to provide access to land records and bring about transparency and accountability in land transactions, the government also stressed the need for modernization of all land records and distribution of khas land among landless farmers.

VISION

A set of new policies related to land administration and land use highlighting appropriate integration of ICTs for ensuring better access to land records and bring about transparency and accountability in land transactions as well as better access to khas land by poor and community groups.

OUTCOME STATEMENT

The reform ensured public access to land records, transparent land transactions and efficient collection of land revenue through modernization of all land records. Socially justified and transparent land revenue imposition and collection system is in place for both the government and citizens. Marginalised citizens established their legal right on khas land through transparent distribution mechanism.

SITUATION ANALYSIS

Land Use Distribution in Bangladesh in Square KM

SL	CLASSIFICATION	DRY SEASON (MARCH)		WET SEASON (SEPTEMBER)	
1	Rivers	6,400	4.34%	7,700	5.22%
	Main rivers	2860	1.94%	3940	2.67%
	Rivers in Sundarbans	1660	1.12%	1660	1.12%
	Other rivers	1880	1.27%	2100	1.42%
2	Standing water bodies	4,245	2.88%	9500	6.44%
	Haors	450	0.30%	3700	2.51%

	Baors	55	0.04%	560	0.38%
	Ponds, tanks, ditches	3000	2.03%	3500	2.37%
3	Forest	19,610	13.29%	19610	13.29%
	Sundarbans (land area)	4110	2.79%	4110	2.79%
	Coastline forest	1400	0.95%	1400	0.95%
	Hill forest	6000	4.07%	6000	4.07%
	Hill scrub and grass	6900	4.68%	6900	4.68%
	Plainland forest and scrub	1200	0.81%	1200	0.81%
4	Cultivated	77,600	52.59%	73500	49.81%
	Field crops	51000	34.56%	17140	11.61%
	Tree crops	4900	3.32%	4900	3.32%
	Seasonal fallow	17000	11.52%	16760	11.36%
	Seedbed only	600	0.41%	600	0.41%
5	Brackish water aquaculture	1900	1.29%	1900	1.29%
6	Salt beds	50	0.03%	50	0.03%
7	Rural built-up	7000	4.74%	7000	4.74%
	Homesteads	5500	3.73%	5500	3.73%
	Institutional	1500	1.02%	1500	1.02%
8	Non-cropped village land	8400	5.69%	8400	5.69%
	Culturable waste	5800	3.93%	5800	3.93%
	Bamboo groves	1250	0.85%	1250	0.85%
	Forest and woodland	1350	0.91%	1350	0.91%
9	Urban	7000	4.74%	7000	4.74%
10	Infrastructure	2100	1.42%	2100	1.42%
11	Estuarine area	8600	5.83%	8600	5.83%
	Total	147570	100.00%	147570	100.00%

LAND MANAGEMENT IN BANGLADESH

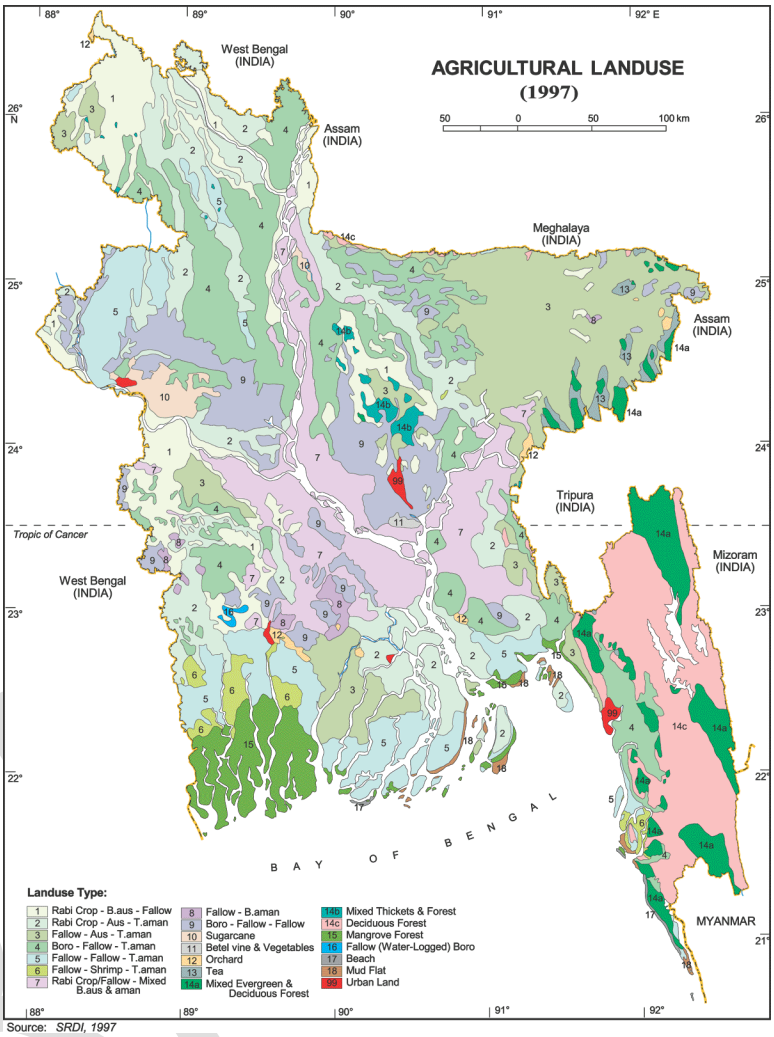
LAND TENURE

Land tenure is the relationship, whether legally or customarily defined, among people, as individuals or groups, with respect to land and is closely linked with land rights and land holdings. One estimate suggests that there are over 11 million farm holdings with more than 65 million fragments. The pattern of land ownership is also highly skewed. Only 5% for the families own more than 7.2 acres of land in total owns 26% of all land. 29% of all land is owned by 70% of the families who have less than 2.5 acres of land[31]. Though the 1984 Land Reform ordinance restricts, inter alia, acquisition of agricultural land by a family beyond 60 bighas (20.00 acres)

[31] "Land Issues in Bangladesh"—workshop paper presented by Md. Balijur Rahman, Sr. Assistant Chief, Ministry of Land

and prohibits anonymous transactions, the present system is simply incapable of enforcing the law.

However, it is actually a lesser of a problem of the archaic land record system of Bangladesh. Presently, about 25% of all land records, constituting about 2.35 million acres, are disputed. Often the dispute is over public land. One estimate suggests that nearly 1.3 million hectares of public land is now illegally occupied. These disputes resulted in nearly 3.2 million litigations that are pending in the court plugging the system and involving around 150 million people. Each dispute, on an average, takes around 9.5 years to settle and the total cost every year exceeds the outlay under the 'Annual Development Plan'.



Source: *SRDI, 1997*

LAND VALUE

Several agencies in Bangladesh are responsible for property valuation, each using its own system and methodology for its own purpose, resulting in conflicting value. Private entities such as Banks also do their own valuation. This has created scope for corruption by undervaluing and overvaluing a particular piece of land to suit which is usually convoluted by the coercion of both evaluators and the people. Such discrepancies at every level usually lead to corruption and impose higher social cost land valuation.

The government recently re-fixed value of land in Dhaka and Chittagong cities by increasing the existing value by four times and in Rajshahi, Khulna, Sylhet and Barisal three times. Even though this system is not adequate as intra-city variation is fixed almost arbitrarily. In general, the value that is fixed is still much lower than the intrinsic value of a piece of land in Dhaka. This fact is

reaffirmed by a recent study which suggests that between 1983 and 2005 the land value of Dhanmondi Residential area increased by about 1200 per cent[32].

The present land tax system requires the owner to pay 12% of annual rent of land as holding tax only if it has buildings on it in a way act as an incentive to leave a land vacant without paying any tax other than land development tax (which is very negligible compared to the land value). As a result, land speculation (and land hoarding) has become one of the most profitable ventures in this city. Additionally, the discretionary power of Sub-Registrars to determine the 'real' value of land leaves ample scope for misuse of the authority depriving the government exchequer heavily.

Additionally, the inadequacy of manual system of holding tax management has also highlighted by two recent reports. According to the Dhaka City Corporation, there are about 230,000 households in the city for which the holding tax are billed. But a study report of UNDP supported Comprehensive Disaster Management Programme of the food and disaster ministry said there are over 3,20,000 buildings in the capital for which it has collected architectural data.

LAND USE

Unfortunately, the available data related with land and land management is inadequate and often contradictory. According to BanglaPedia, the national encyclopaedia, during dry season about 53% of Bangladesh's total land is used by farms, 19.2% is used or earmarked as forest[33], and only about 5% is earmarked as urban land. According to Statistical Pocket book 2009 published by Bangladesh Bureau of Statistics, of the total area of Bangladesh, agricultural land makes up 65%, forest lands account for almost 17%, while urban areas are 8% of the area. Water and other land use account for the remaining 10%.

The Bangladesh National Land Use Policy, 2002 recognises the land use constraints and the promotion of agricultural use of the land (crop production, fishery, forestry and livestock). It also highlights the decline of productivity due to unplanned and improper uses of land. However, the policy has limited implication as its scope for land used for industrial purpose is rather unclear.

LAND DEVELOPMENT

Years of unorganised land sale, revenue, survey and mutation records create serious difficulties for planned land development in Bangladesh. Most of the land development is limited to Dhaka

[32] Ishrat, I., Mitra, S. K., Sholiag, M. A. N and Rahman, M. A. (2007) Land Price in Dhaka City: Distribution, Characteristics and Trend of Change, published in Urbanisation in Bangladesh: Pattern, Issues and Challenges, Jahan, S. and Maniruzzaman, K. M. (ed.), published by Bangladesh Institute of Planners

[33] While MDG Progress Report 2009 report this figure, it is based on tree density > 10% against international standard of >70% tree density.

and its adjoining areas only. The Dhaka metropolis has grown to 1590 square kilometres in 1995 from nearly 400 square kilometres in 1975. The projected size of the capital city by 2025 is more than three thousand square kilometres. Urban Dhaka had 4,625 hectors of land in 1960's, which is now increased to 24,889 hectors in 2005. During the same time, wetlands decreased from 13,541 hectors to 7,128 hectors in Dhaka.

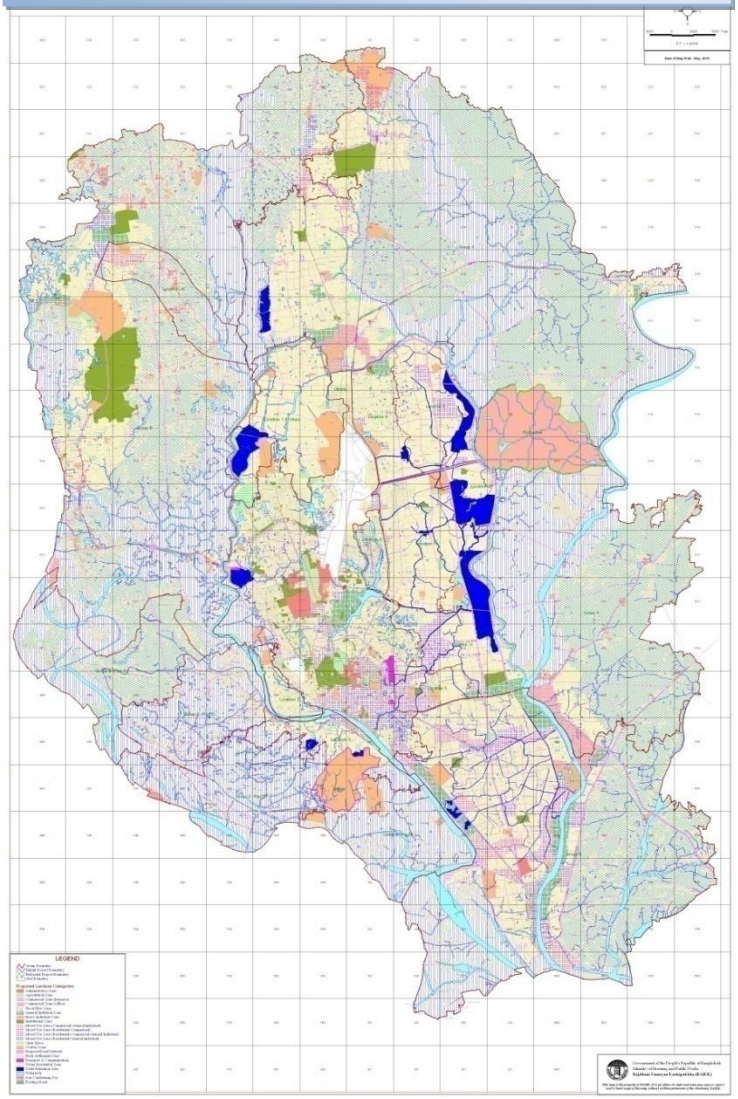
A few systemic and institutional issues make it difficult to promote planned land development in Bangladesh. First and foremost, manual land survey method takes a long time to be completed and therefore become outdated when referred to for boundary disputes and often act as an obstacle for planned land development.

The second major hindrance is associated with a fact that a large part of Dhaka is already built and cannot be easily relocated and redesigned. A related problem is low quality and unsupervised development. For example, RAJUK, the Dhaka city development authority has jurisdiction to ensure that a building is built as per approved plan but has no control over the raw materials and its quality used in construction. With the first 15 days of June 2010, the human tragedy at Dhaka's Begunbari, Nimtali and Shanti Nagar incidentally all are heavily dense populated location in the capital that Bangladesh witnessed simply exemplify the issue.

The third issue is to do with age-old land acquisition laws. The Land Acquisition Law, 1894 and the Acquisition and Requisition of Immovable Property Ordinance 1982, land acquisition for both private and public sector developments makes it a lengthy and inherently difficult process to acquire land for development.

A related human aspect of this problem is the absence of resettlement policy. The acquisition process traditionally did not take into consideration the economic displacement of the affected people. There is a slow but a much needed paradigm shift in the consultation and participatory approach to resettlement projects. Starting with the Bangobondhu Jamuna Bridge, efforts to introduce planned resettlement that takes into account of certain level of people's participation and grievances were introduced. The focus still remained on financial compensation and a one-off package that did not value the

Detail Area Plan of RAJUK



importance of the people's various relations with land.

The recent opposition to the much needed Dhaka Detail Area Plan (DAP) can be explained by the fear of displacement and loosing of livelihood by common citizen of Bangladesh and resistance from private sector developers who are afraid of shrinking scope for manipulation.

SYSTEMIC AND INSTITUTIONAL ISSUES

The present acute problem has both institutional and systemic dimensions. Since the very start in British India, land was predominantly viewed as a source of land revenue for the colonial power. Hence, the function of land registration and land revenue was segregated and which required every land transactions to be recorded in two offices. This duplication and separation created the scope for duplication, inconsistency and corruption.

In urban areas, with the creation of City Corporations and Municipalities, a third authority and with the creation of planning authorities (such as RAJUK) a fourth authority is created—all of them maintains a segment of the record for their own purpose and thereby extending the scope for anomalies.

Another dimension of these institutional issues is the absence of base map for wastelands as they offered no revenue potential. However, with urbanization those wastelands become extremely valuable resources and the source of wide spread corruption.

From the systems perspective, limited capacity and lack of incentive for public authorities made it easy for interested land grabbers to grab public lands often through connivance.

The printed volumes from Cadastral Survey (1890-1940) & Revisional Settlement (1969-83) are worn out and are easy to forge—which makes forging land documents easy. Additionally, presence of enemy properties and abandoned properties acts made these lucrative land properties up for grab.

Bangladesh, being the only active delta in the world, also sees erosion and accretion of new land every year effecting mostly poorest and powerless communities. Land grabbers, in most cases, find it easy to manipulate these people to either deny their rights or to grab newly accreted land altogether.

Finally, difficult and varied inheritance law act as yet another systemic issue that makes land management in Bangladesh challenging.

LAND AND CORRUPTION

Land is a source of wide spread corruption as well. A 'Transparency International' study suggests that in 2006, total bribe paid for land related matters amounts to Tk. 83 billion. 90% of land registration and 92% of the mutation involved bribe. This massive bribe enabled around

59% of the land registration applicant to declare about half of the actual price—saving them substantial land registration tax, which is a percentage of the declared price (adveloram tax), ultimately depriving the public exchequer. Of course, this phenomenon is common in this region. In Transparency International study of 2002 reveals that land sector is in the top three sectors prone to corruption in Bangladesh (rank 3), India (rank 3), Pakistan (rank 1), and Sri Lanka (rank 3).

E-READINESS

Bangladesh has made several attempts in the past to leverage ICT in improving land management with varied degree of success. Some of the noteworthy of them are briefly presented below:

Modernization of Land Administration: During 1995, Ministry of Land (MoL) and the Asian Development Bank (ADB) undertook a technical assistance (TA) project entitled "Modernisation of Land Administration" to assist MoL in studying the existing land administration system, to pinpoint critical short-term interventions, and to design long-term pilot-scale interventions based on technical, procedural, legal and administrative reforms. The TA came up with a detailed plan of action to improve the land management and proposed a clean slate approach. Phase II commenced in April 1997 and was the next stage of a process that prepared a comprehensive nationwide institutional development program to strengthen, and, where necessary, radically reform existing administrative functions. However, the next phase of the pilot that contemplated to cover Bangladesh with 26 to 46 years (depending on technology used) was never undertaken.

Demra Pilot: The Demra Circle of Dhaka city was one area to initiate a pilot project on Computerized Land Management System (CLMS) in 2005, which was completed by June 2005. The CLMS has been developed as a stand-alone GIS based software using MapObject, Crystal Report and MS-SQL Server. The data and interfaces of CLMS are in Bangla. After the implementation of Demra CLMS, the services that were given within a very short time even within a few hours are: land verification report, certified copy of original RS record, copy of mutation khatian with map, corresponding SA plots of RS, other necessary up-to-date information on land ownership, comprehensive report on land use of any mouza, report on determination of land development tax and its collection, and report on land transfer, etc.

From a pilot perspective, the Demra project was very important. It proved a number of issues. It provided the basis for legal reforms; it digitized all the khatians under the circle and stored them in an electronic format. It provided a geographical interface to the stored data and made the entire data visible to the public thereby making the subject transparent. The project is a major step towards digitization of land records as also land reforms with in the country.

Digital Survey Pilot Programme: The Directorate of Land Records and Surveys (DLRS) initiated a pilot program in February 2009 on "Preparation of Mauza Map and Khatian of the five Mauzas of the Savar Upazila of the Dhaka District through Digital Survey using Modern Equipment (GPS,

Electronic Total Station, Data Recorder, Computer, Map Processing Software, Plotter, Printer, etc)". Use of the advanced surveying equipment and GPS technology is expected to improve both accuracy and shorten the duration of the process. The pilot made an attempt to modernize and simplify the revision settlement process in this pilot, with a focus apparently on how existing documents, records and maps are assembled and reviewed for purposes of constructing the new record of rights. If there is a flaw in the pilot project concept, it is its emphasis on the process of revision settlement, and in fact has a stated objective of completing a revision settlement project in 6 months and enabling a 5 year revision settlement cycle for the entire country. While the products of the project will provide a more accurate and accessible database to government land offices, the project does not aim toward a system that would allow continuous updating of cadastre information by either local or central offices. It seeks to further institutionalize the revision settlement process, which may not be the most viable long term solution.

Manikganj Pilot: Under the 'Support to ICT Task force' project, a pilot initiative to scan existing paper based records and capture a few key data digitally was undertaken in the Manikganj Deputy Commissioner's office. Customized software application software was developed for Imaging, Archiving, Retrieving and Printing of Khatian and Mouza Maps. Unfortunately, lack of change management support and lack of interest among the citizen, force the system to disuse quickly.

Digital database of Dhaka city land records: This pilot demonstrated during the 2009 Digital Innovation Fair attempts to provide a web based interface to access 0.42 million ledgers of 191 mouzas of Dhaka city. The ledger is also linked with a mouza map. However, this initiative of 'Directorate of Land Records and Surveys' were not officially launched.

RECENT INITIATIVES

Ministry of Land (MoL) is currently working on Land Zoning acts and rules, which should be finalized soon. The ministry is also actively considering a donor funded programme to modernization of land records to make records reliable and accessible and beneficial for all citizens of Bangladesh, especially the poor. A second donor funded programme at the Cabinet Division is contemplating capacity development of the A/C revenue office to speed up RoR preparation. Inspector General of Registration and the Ministry of Law Justice and Parliamentary Affairs is considering another donor funded programme to automate land registration to automate sale and mutation. A conglomeration of ten local IT firms, Terra Tech Ltd, proposed to introduce a digital mapping and land revenue management system.

LESSONS LEARNED FROM VARIOUS ICT PROJECTS

It is interesting to note that each of the pilots made different assumptions, implemented in different locations and came up with different follow up recommendations. The key points of departures between the recommendations made by pilots are two folds. The first point of departure is whether a fresh 'digital land survey' is needed to implement the modernized

system or the work of 'digital land survey' and 'digital land records' would be separate (and may be concurrent) processes. Already some pilots, notably the ADB supported TAs recommended a clean slate approach, whereas there are few other initiatives, which tried to automate the land administration utilizing the existing maps. On the other side of the spectrum, there is the Demra Pilot, in which an integrated database system was developed which contains a digitized map based on existing cadastral maps and can be extended to include land records.

The second point of departure is whether the public institutions would lead the process mostly by themselves or private sector needs play a key role in data collection/survey and even data validation and public institutions get involved only as a supervisor/quality controller. The first argument assumes that the capacity of the public institutions would be strengthened/ developed so that they can play the envisaged role. In case of the private sector led argument, it is implicitly assumed that the private sector already has the required capacity and can actually transfer the technology, where needed, during the course of the implementation. The major disagreement between the groups is around the question of accountability. The first group believes that a public sector led solution is more transparent and accountable, while the second group believes otherwise. All the camps seem to agree about the role of private sector as an alternative record delivery channel.

RELEVANCE OF ICTS

Information and communication technology can improve storage of land records and maps, quicken search for particular information, and make relevant information available to a wider audience and thereby enhances transparency. The revised PRSP-II clearly emphasizes on delivery of land related services to the people through modernized and efficient land administration and refers to computerisation of the land records and land management system as one of the strategies for delivering land related services[34].

Searchable databases for Record of Rights (RoR) or Land deeds along with other land records such as case records and registers can be stored either as scanned document or in digital form. The key benefit of such a database system would be easy search and access features so that required information can be made available reliably and within a short time and can be made accessible over the web and for the public consumption. Such a database can be created to develop a digital archive of very old map and documents to provide necessary reference to settle land disputes. The Dhaka city corporation pilot is an attempt that leveraged such as digital database technology. Of course, to implement such a system necessary change in legal and operational framework is needed to ensure proper protection from mishandling, and also to give such electronic documents similar standing as paper records in the court of law.
ICT can be used to conduct land survey to prepare accurate maps quickly. Such ICT based survey can be used in 1) Digital survey and settlement 2) Geodetic control survey and geo-

[34] Steps towards change: National Strategy for Accelerated Poverty Reduction II (Revised) FY 2009-11

referencing of Mouza map sheets 3) Digitization and geo-referencing of Thana, District and National maps of Bangladesh. By leveraging a mix of aerial photography and digital ground survey techniques (GPS and/or TS) followed by digital recording of rights and subsequent adjudication processes such digital maps can be produced. Notably, production of such a survey would also make updating of maps based on land mutation easier.

Computerized transaction management systems such as those that are used in modern day Banks can be used to record land related transactions such as buy, sale, lease etc. to make the system transparent and hassle free. Such a land registration system then can be 'linked' with a digital land record and archive database so that together these three systems form an integrated system that ensure accurate, up-to-date land records system and also with a land revenue system to ensure equitable and transparent imposition and collection of land revenues.

Key Strength and opportunities	Key Challenges and Risks
• High level of political commitment and perceived public demand • A good range of pilot initiative produced a wide range of lessons • Active and vibrant private sector who can invited to participate in such a massive project like digitization of land records under the recently promulgated PPP policy that enable meaningful participation of private sector in such a massive project. • High level of penetration of mobile phones in the hands of population • Sufficient donor interest to support land reform • Increased revenue generated from the sector by way of land registration and land tax can bear a large part of the cost • Any reform in land sector will automatically improve law and order situation by reducing the number of litigation	• Past interventions, except from one, took a very narrow approach and made conflicting recommendations • National/Unique Identification system is not available, making it difficult to identify the buyer/seller/owner easily. • Deep rooted vested interest groups have successfully prevented land reform initiatives in the past • Long term initiative mean not every part of the country can be brought under the new system simultaneously giving the vested quarters enough time to regroup to derail the reform initiative. • Such an initiative needs support and commitment across political party line to ensure its sustainability during the long period of implementation.

STRATEGIC PRIORITIES

The technical principles concerned with building, upgrading or re-engineering a land administration system are critically important but not the only important aspect. A finer balance between technical issues and administrative and policy issues is needed for implementing any ICT based land reform strategy. It is important to develop technical solutions which are user driven, which can integrate both formal and informal systems and which utilise appropriate levels of computerisation in sympathy with the development of the country. Computerisation, while an integral component of almost all land administration reforms, can be a high risk strategy if not introduced carefully[35]. It is critical to recognize that while the introduction of appropriate technical solutions is critical to the success of any land administration project, technology is not an end in itself and must serve the overall objectives of the reform such as improving the operation of the land market or providing security of tenure[36].

In this context, some lessons are presented before elaborating the strategic priorities:

- Land is not just an ICT problem: A variety of system failure and denial of human rights and access to justice issues played critical role in land management
- A simple digitization is simply not possible: Existing maps are frail and illegible while a significant portion of RoRs in circulation are unreliable and not updated
- There is no easy fix: Building a sustainable solution will take time. For example, the most discussed (partial) Indian success story of land management started in 1975!
- Land system modernization is a complex problem that needs an integrated solution: Trying to separate out different but unconnected 'boxes' –e.g. registry and records or survey or rural-urban- is unlikely to help improve the performance greatly.

The following assumptions are important in drawing out the list of strategic priorities:

- The necessary capacity (people, processes, framework) for systemic change needs to be built gradually as in most successful cases, these changes are organic
- Fragmented mandate of various institutions poses a challenge for building an integrated solution for efficient land management. However, these fragmented mandates cannot

[35] Suwarnarat, K., Karuppannan, S., Haider, W., Yaqub, H.W., Escobar, F.E., Bishop, I., Yates, P.M. and Williamson, I.P., 2000. Spatial Data Infrastructures for Cities in Developing Countries: Lessons From The Bangkok Experience, Cities. 17(2) 85-96.

[36] UN-FIG, 1999. The Bathurst Declaration on Land Administration for Sustainable Development. Report from the UN-FIG Workshop on Land Tenure and Cadastral Infrastructures for Sustainable Development, Bathurst, NSW, Australia, 18-22 October, 1999. A joint initiative of the United Nations and the International Federation of Surveyors. http://www.sli.unimelb.edu.au/UNConf99/ Also see at this WWW address the Findings of the Workshop and the background papers prepared for the Workshop and presented at the subsequent International Conference on Land Tenure and Cadastral Infrastructures for Sustainable Development, 25-27 October, 1999 Melbourne

be consolidated overnight and change of this magnitude needs to be led from the top but participated by all.

- Since the issue touches the live and livelihood of millions of people, careful considerations are needed to ensure pareto optimality and cascading effect of change, both technical and human, needs to be carefully considered

Consolidation: Lessons learnt from various pilot interventions seem to be conflicting at the first glance. The relevant authorities will conduct further investigations to sift through the evidences taking into considerations the latest technological advances and develop a new set of policies for proper land administration and land use. A review process will be initiated to consider- how the stakeholders of those policies and legal framework may be brought on board. A high-powered independent body will be established to give recommendations for next steps based on such a review and through a consultative and inclusive process. Utilizing some of the ICT resources available including the voter/national ID database and how such important resources can be leveraged by a modern land management system - will be considered in such a review. The review process will need to consider additional legal and policy response which may be required including in financial legal and policy framework, criminal codes, etc. and how the stakeholders of those policy and legal framework may be brought on board.

Quick-Wins: While the consolidation process is underway, a few 'Quick-win' projects will be implemented in the land sector which would not only bring in tangible change in overall land management but also will help the consolidation process by supplying it specific case studies and responses from the ground. The following quick-wins will be targeted even before the consolidation process is formally started.

Public Land Management: Various public agencies like Bangladesh Railway, Power Development Board, Department of Forest, etc. own a vast amount of land. Ground-level experiences show that most of these agencies lack both tools and capacity to properly manage these lands. As a result not only are these agencies losing valuable assets every year to unscrupulous land grabbers, such lack of management is also indirectly contributing to the deterioration of law and order.

A 'Public Land Management' system to maintain a land register will be introduced for public agencies/departments. Such a system will maintain a database that contains scanned copy of all the land records of all plots that a particular agency owns including scans of relevant maps.

- The key feature of such a system will include, inter alia:
    - Maintain up-to-date and complete record of all RoRs and maps of land own by the agency
    - Manage and track payment of all relevant land revenues paid by the agency

- Keep track of all temporary transfers including lease given in favour of private individual or institutions including utilization of such leased land. In case of 'Sayrat Mahals', the system can also track receipts from such temporary leasing.

Revenue Collection: City corporations, municipalities, and other local government bodies who regularly collect land development and other taxes from citizens residing in their particular jurisdiction will be encouraged introduce GIS based land revenue collection system.
Property tax is imposed based on locality and the amenities that are available (access to running water, etc.) It is not uncommon that some city dwellers, wrongly or in connivance with the tax officers gets an advantage of being assessed at a lower rate. The opposite can be true as well whereby a resident of the town is charged at a higher rate. Such discrepancies not only create non-transparency but greatly deplete the financial strength of the city or town. A GIS tracking system will be introduced, which will not only keep track of those property for which tax is not paid, but will also single out properties if the applicable rate for such property is lower or higher rate than its neighbours (abutters).

Using a system in major city corporation and towns, hence, will not only enable the institutions to collect taxes in a transparent manner, but will also gradually form the basis for reliable land records in the urban and peri-urban areas.

Digital Land Zoning System (DLZs): A major strength of land zoning is that it may help to assess the potentiality, limitation and vulnerabilities of different kinds of land by making categorizing such land in a systematic way.

The main objectives of the land zoning are:

- To assign the land to its best possible uses like; agriculture, livestock, forestry, tourism, shrimp culture, natural reserve, industrial development and other uses in order to get optimum economic benefits resolving conflicts of interest;
- To prevent (further) land degradation and restore degraded lands and to preserve and protect eco-systems with high ecological and cultural value.
- To prevent or resolve conflicts of interest between different land users and line agencies;
- To ensure that native flora and fauna are properly protected and
- To preserve places having cultural and heritage values.

Upazila wise Land Zoning Map will be developed which will be made accessible to prospective users over the internet. The DLZS will be instrumental to grow awareness among the planners, land users, policy makers and decision makers for rational use of land resources. This will also contribute significantly towards enforcement of land zoning laws and village improvement acts.

CAPACITY DEVELOPMENT OF KEY STAKEHOLDERS

Given the present state of technology in use at various agencies involved in land administration and the present organizational culture and values, modernization of land administration can be

a seen as a futuristic objective for the agencies. This will also limit the scope for the agencies' participation in the technology solution design and this will be dependent on external consultants. Notably, the present manual system of land-management and the proposed ICT based management represent distinctively different cultural context. Hence, efforts will be undertaken to gradually transform the work culture of relevant agencies.
To this end, modern technology will be introduced to support improved work-processes of the relevant agencies. Additionally, skill-training programme for the management of these agencies to build leadership skills such as negotiation skills, communication skills etc. will be organized.

At the same time, work to establish a reliable nationwide network, a unique identification system and a coordination body will be undertaken. Reliable power, maintenance facilities, infrastructure like tier-3 data centre, policy framework for security etc. will also be undertaken.

PARTNERSHIP STRATEGY

Because the related mandate is fragmented, it is important that a unified public agency is created which provides a common platform for various agencies to discuss and build consensus. Considering the capacity needs for any large scale undertaking, participation of private sector would be essential. Especially, the point-of-sales support to be provided to the citizen needing related services, which is essentially provided by the private sector quasi-legal practitioners such as 'deed writers' even today, has to be provided by private sector operators. Since, land is a sensitive issue and often the only fixed asset for a large majority of people, extreme care needs to be exercised in building partnership involving survey and preparation of legal documents/maps etc.

INDICATORS MEASURING PROGRESS

- Number of public organizations that uses a computerized land management system
- Number of municipalities/city-corporations leveraging computerized revenue management system
- Percentage of citizen who make on-line payment of land tax
- Number of days required for completion of land registration and mutation process
- Number of citizen who accessed land records/information on line

2.ix. ECONOMIC PROSPERITY

KEY PROBLEMS	• Government-business interaction is not seamless and smooth • Cost of doing business is high • Access to market is limited • Support structure like regulatory clearance, tax administration, payments are complex and cumbersome
VISION	A vibrant economy where domestic and foreign investment is adequate and business environment is conducive enough for contributing to rapid national income growth.
OUTCOME	Quality domestic investment and foreign investment has grown up to due conducive regulatory environment and efficient one-stop support.
STRATEGIC PRIORITIES	**OPERATIONAL IMPROVEMENT** The Ministry of Commerce, Bangladesh Bank and relevant agencies will undertake initiatives to launch Internet and mobile phone-based G2B services for regulatory approval, taxation and payments. All government agencies will launch full cycle on-line procurement processing system for reducing unnecessary influences. **TRANSACTIONAL IMPROVEMENT** The government agencies will undertake initiatives for introduction of e-trade facilitation for reducing cost of doing business and create business opportunity for MSMEs **CROSS AGENCY COORDINATION** A G2G common public service infrastructure will be developed for improving cross agency coordination and service integration thus far facilitating one-stop service for businesses **INFORMATION SERVICES** The relevant government agencies will launch Internet and mobile phone based information services for the businesses, particularly for domestic and foreign investors.

INTRODUCTION

The Government of Bangladesh, in its NSAPR II, recognizes that the economic growth must be driven by the private sector, and is progressing towards improving the business environment. However, reforms that need to be in place needs to be deeper and wider to allow business to operate efficiently, keep Bangladesh competitive, and create the jobs that reduce poverty. Beyond the regulatory reform, however, a key focus is streamlining government-private sector

interaction. The less the cost of doing business in a country, the more investment friendly the country becomes.

The need for investment climate reform in Bangladesh, a country where 42% of its 150 million people live in extreme poverty, is severe. In the annual survey done by International Finance Corporation (IFC) for an index on the ease of doing business in different countries, the findings are not favorable. Bangladesh ranked 167/175 for registering land and 134/175 for trading across borders and in the Kaufmann and annual Transparency International Surveys, the results are not positive. Such an investment climate is poorly positioned to drive the significant private sector contribution needed for sustained poverty reduction.

VISION

The vision of the government is to create a conducive environment where private sector can operate efficiently through improving the support structure like banking, increasing government efficiency in regulatory clearance, taxation, payments etc. On the other hand, it is alo expected that the private sector works towards social equity by producing goods and services not only for the wealthy citizens, but also for the bottom of the pyramids and by the producers at the bottom of the pyramid. In this process, ICTs are envisaged to play a catalytic role both for the private sector and the government. Effective use of ICT in improving commerce and investment in Bangladesh can have significant impact in equitable economic growth in Bangladesh.

OUTCOME STATEMENT

Quality domestic investment and foreign investment has grown up to due conducive regulatory environment and efficient one-stop G2B support.

SITUATION ANALYSIS

COMMERCE

The key functional categories of commerce where there ICT relevance is significant are: information and money transaction, G2B Business Process and compliance.

CROSS BORDER TRADING AND PROMOTING LOCAL BUSINESSES ABROAD: In this globalized world, increasingly the geographical boundaries are erasing. Better promotion of product, facilitated by a strong online presence can bring large amount of new businesses from abroad for local businesses. Export Promotion Bureau of Bangladesh in conjunction with foreign ministry establishment worldwide can play a major role here by creating attractive web portals that promotes local products abroad. Customized for countries with big market potential niche Bangladeshi products can be promoted online complimented by offline promotions such trade fairs etc. To take full advantage of these new market opportunities, Bangladesh is moving

towards cross border e-commerce transactions. Merchant banking facilities are going to be available soon s Bangladesh Bank directive allows commercial banks to offer the service to the exporters. Such online transaction facility is expected to open a new horizon for small and micro enterprises, given that logistics facilities abroad and cheap transportation facilities are available.

In cross border trading, trade facilitation is an important area, which essentially means seamless online document transfer process on the both sides of the border. The connection of business houses with the customs authorities online can facilitate processing of freight forwarding online and significantly reduce turn around time for a shipping line and reduce cost of export and import for the business community.

MATCHMAKING OF COMPANIES: Internet is quite effective in potential match making without human interaction. Frequently foreign companies look for local trading partners to work with. A database of local companies that do businesses globally along with their field of expertise can provide the much-needed match-making opportunities for local companies. Export Promotion Bureau and Board of Investment can play a major role in facilitating this.

GROWTH OF MSMES THROUGH INCREASED ACCESS TO NEW MARKET AND NEW CAPITAL: Internet can provide a huge market opportunity both internally and externally. MSMEs seldom graduate from small are lagging behind because they lack the access to better market outreach. However, facilitation of ecommerce and providing required market and business skills can provide individual businesses the much-needed access. As the connectivity increases, individual businesses should be trained how to do market research online so that their products have better chance of gaining acceptance. Export Promotion Bureau and SME Foundation both have a big role to play in this regard in promoting ICT in SME growth via external market access. Although, significant legal barriers in doing online commerce in Bangladesh has lifted, the technical challenges in domestic cashless transaction will remain for some time. In terms of access to capital for SMEs, it is imperative that central credit information bureau be computerized and be made accessible by banks so that the risk for the lenders is reduced and capital is made more available for deserving SMEs.

G2B PROCESS CONTROL AND EFFICIENCY AND TRANSPARENCY: The government-to-business interactive processes must be made more efficient and transparent in order to raise business confidence. The process of getting regulatory information is currently not so easy. Internet websites should be used to disseminate regulatory information for potential investors. The dissemination of information should be followed up by offering various e-services that brings down the cost of doing business in Bangladesh. For example, the process of registering a company used to take about 30 days and lot of running around. However, it has now been made easy where one can do 90% of the processes online bringing down the time it takes to register a business dramatically. Similarly, the process of getting permits through various agencies can also be streamlined by offering a one stop centre using technology. Once a company is formed, its shareholders must be protected through appropriate controls in the Securities Exchange Commission. SEC, therefore, needs strong control mechanisms in terms of

protecting the investors. The major obstacle behind providing good G2B service is the lack of cross-agency coordination in providing the service. There is a lot to be done in cross agency work coordination using technology. Implementation of a common public service infrastructure is an important element which can help enable government to government (G2G) interaction using ICT. While the dissemination of information here is not only important but in terms of getting licenses, permits or submitting applications for EPZs, it is also very important to provide efficient services using technology.

MONITORING AND COMPLIANCE

PRICE CONTROL AND STANDARD MIANTENANCE

Monitoring and compliance is a very important part of the commerce sector to protect the interest of the consumers. BSTI, the agency responsible for maintaining standards and testing, is an organization that increasingly works with local businesses in service delivery. Automation of their internal process and the G2B handling is a very important attribute that is necessary for improving the service and the standards. Similarly, in the area of price control, automation and improvement in service delivery can only be attained with the help of ICT. The most important element in this section is however, taxation.

TAXATION

Being the major contributor in revenue collection the National Board of Revenue (NBR) serves the citizens through various services most of which are in conventional paper based systems. Lack of clarify and convenience in paying taxes creates additional hurdles for the businesses in running it effectively.

SERVICES TO CITIZENS:

- TIN registration through online/ ICT enabled services.
- VAT registration(BIN) through online services.
- E-filing of Income Tax returns.
- E-filing of VAT returns.
- E-payment of Duty & Taxes fully or on installment basis.
- Customs declaration, value declaration, manifests submission and status checking of those online.
- Bond import & export processing electronically.
- Help desk & service centres.

PROCESS AUTOMATION:

- Audit tracking and Risk Assessment for both Income Tax and VAT.
- Notifications (statutory and others).
- Service reminders and alerts
- Digitization of manual filing and assessments.
- Internal (and external to some extent) survey based on processing of information collected from different stakeholders in order to broaden tax base.

READINESS

In terms of readiness, the following applications are in operation/ about to be launched i.e. External module to ASYCUDA++: Bangladesh Customs has been in the forefront of modernizing its service delivery system among the public sector enterprises, especially since the introduction of the Automated Systems for Customs Data (ASYCUDA) in 1994.

Recently, provisions for online submission of customs declarations and cargo manifest have been introduced at Chittagong Custom House (CCH) under Public Private Partnership (PPP) through some third party applications developed locally, although core processing is performed by ASYCUDA. These modules are being developed under the direct supervision and direction of Customs officials in collaboration with the local private sector software development firm.

Citizen centric services through the new modules:

- Under the new web based modules, the declarations are being submitted through web against User ID and Password issued by Custom House.
- Cargo manifest submission is now fully automated enabling the Shipping Agents and Freight Forwarders to submit the manifest and its subsequent amendments, if any, electronically. More than 5-7 types of users which include Bangladesh Navy, Port Authority, private off-dock operators etc., can now view, track or block suspicious consignments through web and use the system to effect necessary action.
- Development of Valuation Database Module would assist Custom Houses to verify if the value declared by the importers properly reflects the transaction value in line with the WTO Customs Valuation Agreement.
- All import and export processings of EPZs are automated.

1. TIN Generation/ Registration through online facility: Allocating an identification number to a taxpayer- the Taxpayers Identification Number (TIN) is the very first step in the Income Tax collection process. Decentralized system of TIN issuance and subsequent recording of information in computer database is in operation now. But this has produced the worst case scenario and certainly has exceeded the even the preceding manual GIR issuance considering the limitations. The existing system resulted in duplications/ multiplications and ultimately a database that did not prove to be very functional. To have a clean and useful TIN database and moreover to provide this service to citizens in an effective and hassle free way NBR is going to introduce the new web based issuance of TIN Registration/Generation system. Initially the Taxes Circles will act as kiosks and the Taxpayers will have the instant TIN facility. The NID will provide the validation facility being checked online through a VPN between NBR and Election Commission before the generation of the TIN itself. With the introduction of e-payment services in the country the system will be more efficient, which in turn will create the strong platform of electronic filing of Income Tax returns- one of the quick wins of NBR as revealed in the National ICT Policy, 2009.

   Citizen centric services that will be made possible through this:

- A correct TIN will be allocated to citizens instantly.
- Citizens will have instant information about their status in the TIN database specially if there is any number allocated in favor of him anyway.

2. Online BIN (Business Identification Number) Generation:
   NBR is about to launch a new online BIN generation system, which will create a clean and efficient database capable of handling and managing the future plans - online VAT return submission and VAT payment through e-payment. The TIN generated through the new system will provide the validity as will as ensure the uniqueness.

   Citizen centric services that will be made possible through this:

   - The citizens will be able to generate their Business Identification Number online instantly without their appearance in the VAT offices.
   - After the BIN generation citizens will have confirmation notice on screen and the BIN certificate will be sent to their addresses by mail in the quickest possible time.
   - The system will create the platform for the taxpayers to be able to submit VAT returns and pay VAT online through e-payment.

INVESTMENT

Promoting country for foreign investment : The Board Of investment plays a key role in making comparable and up to date data available via website. The website currently holds a large amount of information regarding the country. The goal is to make the website and the content more dynamic that will be updated with new information on a regular basis to highlight the comparative advantage of investing in Bangladesh over other countries. There should specific e-services that should be introduced through this site directly so that potential investors can get information on demand.

Facilitating Foreign and local investment: In order to facilitate more foreign and local investment, the Board of Investment envisages a one stop centre of website for potential investors to apply for permits, get information and also have potential match making with local businesses. Key resources need to be allocated in this regard.

Privatization: Government increasingly has been looking to privatize less profitable or loss-making nationalized companies and looking for investors from home and abroad.

REGISTERING NEW BUSINESSES AND GETTING SUBSEQUENT PERMITS AND LICENSES

Registering new businesses has been made much faster. Currently registration is possible within a day although there are some offline steps involved. The plan is to make that even more simpler as well. Once this process is completely automated, it will be important to link it with cross agency e-services that can be rendered online. Services such as VAT license, Trade licenses, TIN number, information regarding bank accounts, property related info etc should be tightly integrated so that businesses get the feel for a one stop service centre instead of

spending hours and days visiting one government office to another looking for information and services. Again, the role of cross agency service integration is essential here.

REGULATORY INFORMATION DISSEMINATION

Currently, most of the information on regulatory environment is very much static and no customization is available. The information available on the internet is not customized. In order to improve efficiency in service delivery, such information should be offered through internet and with some level of interaction and customization. For example, a potential investor looking to set up a restaurant should be able to go to a website and find out the regulations and the number of permits he/she needs to obtain from the website.

STRATEGIC PRIORITIES

Strategic priority therefore should be offered in five key areas:

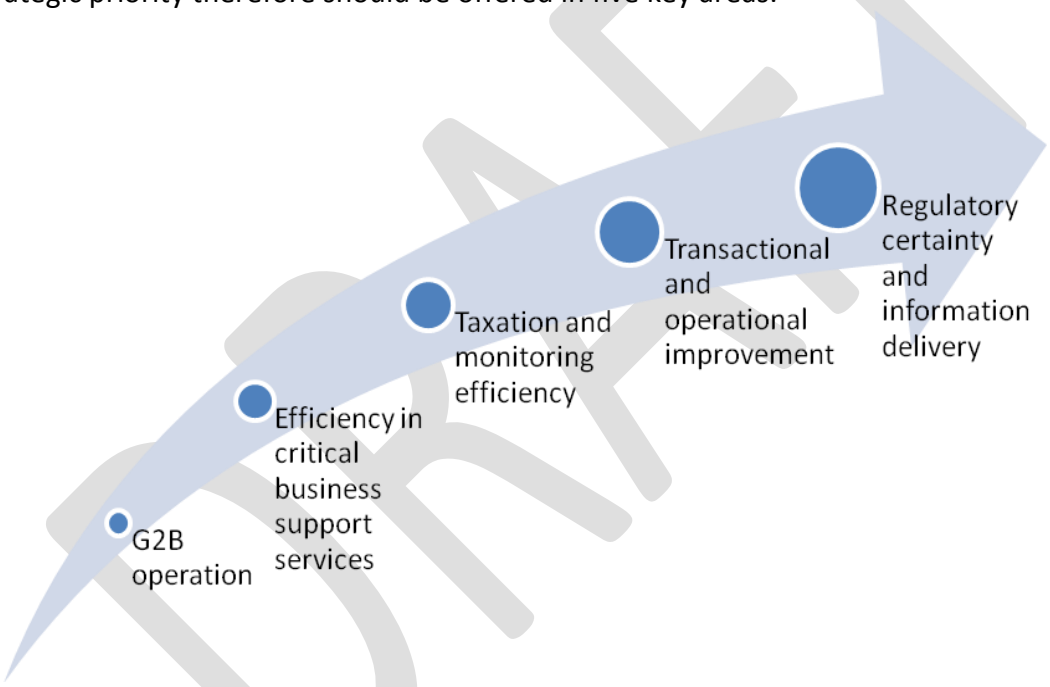


Figure: Strategic priorities for energizing commerce and investment

- G2B Operational improvement: Increased automation and improvement in G2B service delivery so that the cost of doing business is reduced --
    - Online tender management and procurement
    - Quicker transactions
    - Dissemination of online regulatory information
- Transactional improvement:
    - Facilitation of online commerce, both internal and cross border, to increase market access for SMEs

- Cross Agency coordination:
    - Improved cross agency coordination and service integration in G2G interaction through a common public service infrastructure which will mean increased efficiency and quick resolution for business. Particular focus areas in revenue collection and interacting agencies with NBR.
    - More e-services that helps businesses reduce time and cost of doing business
- Regulatory certainty and information delivery on such:
    - Robust and dynamic information delivery on demand through internet for potential investors and consumers
- Improving efficiency in support services such as port control and taxation
    - Creation of a Data Centre in NBR: To gather necessary information from all the possible stakeholders and to use those efficiently in order to provide services to the door steps of the citizen a data centre will be created in NBR soon. This will in fact enable all the e-services of NBR to be in reality.
    - e-Filing of Income Tax returns and e-payment of tax: The ground works have been done and the launching of new TIN Generation system and the creation of a data center of NBR will facilitate such service to be in reality soon. A primary service on web based return submission (although with some limitations) which is in operation in LTU will be shown in the fair.
    - e-filing of VAT returns and e-payment of VAT: The launching of new BIN Generation system and creation of data centre in NBR will create the foundation of such service. Taxpayers will be able to submit VAT returns and pay VAT online in a hassle free manner without their physical appearance in VAT offices.
- Improved control mechanisms in the form of better tracking of businesses and taxation and also government service delivery

PARTNERSHIP STRATEGY

The government will work with development partners to improve investment climate in general and deployment of G2B services. Public private partnership will be an important route in this regard as there are some success stories already available in this area in Bangladesh.

KEY INDICATORS MEASURING SUCCESS:

1. Annual FDI growth rate in Bangladesh
2. Cost of doing business index created by IFC
3. Internal annual revenue collection
4. Percentage of GDP from the SME sector
5. Annual Transparency International Survey indicators on commerce and transparency

3. ENSURING A STRONG SUPPORT FRAMEWORK

3.II. SELF-GOVERNED AND RESPONSIVE LOCAL GOVERNMENT

KEY PROBLEMS	• Operational efficiency of local government institutions is low which impede effective access to services and information by the citizens • Transparency and accountability of LGIs need improvement as key service delivery and all safety net programmes are being implemented through LGIs • The inadequacy in number and skills of LGI officials are one of the major barriers in transforming LGIs into focal points of all development activities in the country • Citizens' voice is unheard and their participation is not effective which creates gap between citizens' perception and direction of the central government.
VISION	To unleash the power of ICTs for increased efficiency, transparency and accountability of local government institutions so that they able to deliver information and services to the citizens and involve them in governance.
OUTCOME	A connected system of local government institutions across the country is on the ground for efficient governance and effective information and service delivery to the citizens through enhanced transparency and citizens' participation.

STRATEGIC PRIORITIES

- The Ministry of LGRD will create seamless vertical and horizontal reliable and high speed connectivity among the local government and central government institutions and agencies. Such network will help decision making and implementation process quicker. More importantly, inter and intra-agency horizontal and vertical electronic connectivity will increase operational efficiency as well as simplify decision-making processes.
- The Ministry of LGRD will take initiative to integrate ICTs in local government institutions for back office automation so that front end service delivery is possible through one-stop windows. Paper-based procedures will be replaced gradually by automation and digitalization of all data and records. Application of ICT in office processes such as computerized billing system, inventory management, computerized data entry etc. will help establish more efficient service delivery regime at local levels. Use of ICT in communication i.e. through e-mails, on-line blogs and notice boards, mobile phone and SMS etc. and knowledge management i.e. databases, digital copies of documents instead of paper, digital archives etc. will significantly improve efficiency of the LGIs by simplifying communication, document searching, decision-making etc.
- In addition to automation of processes inside the local government bodies/agencies, a digital framework or common platform will be developed which will enable the bodies to interact with each other smoothly.
- The LGRD will undertake programme for comprehensive skills development of the government officials in using ICTs for their day-to-day business. Government officials and elected representatives of local government bodies in both urban and rural sectors will be given training to develop ICT skills and adaptability to the change in old system.
- The government will create scope for service providers both within the government and private sector to deliver services and disseminate information for citizens using multi/ alternative channels like Community e-Centres, cellular phone messages, community radio and television as per their convenience is a top priority. The information and service delivery system will focus on education (e.g. formal, non-formal and technical/ distance learning), health-care (e.g. healthcare management, telemedicine), agriculture (e.g. pesticide, high-yielding cropping), disaster (e.g. preparedness etc.), self-employment creation, government services, human rights protection and so on.
- Community e-Centres in Upazilla Complex and Union Information and Service Centres (UISC) in Union Parishad Complex are envisaged to be key information dissemination and service delivery points for rural and peri-urban citizens. Such centres are to be run with participation of private sector and non-government organizations for efficient operation and socio-economic viability. Fostering public-private partnership will be the key for maintaining a large network of such centres.
- One stop services/ help desk in all unions, upazilas and districts will be created for enhancing citizens' access to services. These will create multi-layered delivery points from the service providers and realize the government's goal for increased decentralization. However, in designing and expanding the network of one-stop-service delivery system, 'snow-balling' approach will be taken.
- Mobile phone, as a supplement to the physical location based information and service delivery points – is a part of strategic priorities service delivery will be designed in such a manner that poor are not excluded.

INTRODUCTION

Local government institutions are the cornerstones of democracy. The central government reaches its remotest citizens through local government institutions and vice versa. On the other hand, in order to deliver needs-driven services to citizens in an efficient and effective manner and be participant and responsive, local government institutions need to be self-governed and democratic. A democratic and self-governed local government not only improves the immediate living conditions of people, but also leads to more equitable relationships in the society, which is a prerequisite for sustainable socio-economic development and poverty reduction.

The local government bodies may be divided into two groups: urban local government bodies and non-urban local government bodies. There are 6 city corporations, 197 municipalities (pourosoas) and 64 Zilla Parishad in the country, which fall into urban category. There are 481 Upazilla parishads and 4553 Union Paridhads, which fall under non-urban local government bodies. The local government bodies have their administrative wings and also agencies for implementing central government's programmes as well as their own programes.

Different government and non-government pilots are ongoing and gradually developing effective system of service delivery ensuring government officials' accountability towards elected bodies and then towards their constituency as the ultimate beneficiary. The government is taking steps for strengthening local government to make it more efficient, people-responsive and participatory.

The modern basis for local government is affirmed in the Constitution (Article 9, 59 and 60) that defines a significant role for elected government bodies at each administrative unit of the country. The second national PRS (i.e. National Strategy for Accelerated Poverty Reduction II) (2009-11) has highlighted the importance of local governance as one of the key priorities. The Charter of Change clearly shows a commitment for stronger local government and decentralization of power. Recent addition at the policy level is the Right to Information Act, 2009 which affirms citizens' access to information at each administration units, including the Union Parishd.

The ICT Policy 2009 has given guidelines about incorporation of Information and Communication Technologies (ICTs) in local government by the agencies of Local Government Division (LGD). As an action item, establishment of Community e-Centres (CeCs) at all local government tiers has been proposed. It further suggested online help desk for citizens, filing of public grievances, issuance of trade license, publication of citizens charter and multi-channel info delivery (e.g. web-based information, cellular phone messages). Self-governed, participatory and responsive local government is beneficial to both citizens and local government entities in terms of easier delivery and access to service and information.

VISION

The vision for local government is to have:

i. Increased Efficiency of Local Government Entities: As was mentioned earlier, the local government agencies are the main vehicle for implementing various agenda of a government. Various programmes and schemes are being implemented by the local government agencies. Some of the programmes and projects require quick response and implementation, where timeliness is crucial. For example, natural disaster-preparedness and post-disaster recovery needs quick delivery for reducing sufferings of the citizens. The connectivity with the central government agencies and information about various categories of citizens maintained in electronic system can make such quick response more effective. Information exchange, information about progress of various programmes an schemes, back-end processing of services for the citizens can be dramatically improved once a seamless information management system is built through out the country. Communication and information sharing over the mobile phones and Internet is significantly less time-consuming than conventional method of communication i.e. through mails.

ii. Improved Transparency and Accountability: The current government's motto is to work towards building a corruption-free society and ensure maximum utilization of the scarce resources allocated in the annual development plan. The integrated information management system will play an important role in reducing corruption and improving transparency of the government agencies. For example, access to free medicine may be improved dramtically if the central warehouse is linked with hospital based warehouse through online inventory management system and mobile phone-based citizen's notification system. Better access to free medincine will play a role in having more working days for poor patients and greater contribution towards both personal and national income. Such system can play a path-breaking role in poverty alleviation.

iii. Effective Information Delivery: Basically, citizens need access to four types of information:

iv. Information related to government programmes, projects and schemes and safetynet programmes for ensuring citizens' role in better implementation

v. Information related to opportunities for income generation or income enhancement

vi. Information related to basic rights like education healthcare, human rights and so on

vii. Infromation related to citizenship, which ensures their participation in democratic governance process.

viii. Decentralized Service Delivery: The virtual access and access through community based information centres are two effective vehicles for decentralization of service delivery with effect of creation of more employment. For example, availability of passport application in Upazilla or Union portals and option for submitting the application at Upazilla or Union level will supposedly create a less time-consuming and less expensive system for the citizens as well as decentralize the service itself.

ix. Participatory Governance: In a democratic government, citizen's participation in formulation of plans, acts and rules etc. are imperative in order to properly address the needs of the people. ICT-enabled governance enhances citizen's participation in governance. The opportunity to access information about government's plans, rules and activities and to generate queries and provide feedback on those encourages general people's participation. Apart from computer-based connectivity, the wide-ranged network of mobile phones can also be an effective tool to receive feedback from the people.

OUTCOME STATEMENT

A connected system of local government institutions across the country is on the ground for efficient governance and effective information and service delivery to the citizens through enhanced transparency and citizens' participation.

SITUATION ANALYSIS

Infrastructure: One of the key readiness components is a seamless high quality network among the government agencies spread across the country both horizontally and vertically. A number of local government institutions are connected internally through LAN, however, the connectivity is available only through ADSL with district administration.

The level of penetration of ICTs is still low and the usage of ICTs are generally limited to internal operations such payroll, accounts, communication over various ICT-based channels e.g. e-mail. Local Government Division (LGD) installed LAN during 2000-2005 under the project 'Installation of Computer Network at Local Government Division'. Officers at all levels of LGD have their own e-mail accounts and official correspondents with District level offices are now being done through e-mails. LGD maintains a website (www.lgd.gov.bd) and provides ICT-based training continuously to its officials. It also put together a database of all Pourashavas and Union Parishads.

The champion in using ICTs among local government institutions is Local Government Engineering Division (LGED). It provided Internet connections, software packages, computers to other LG bodies such as Pourashavas, District offices etc. It uses GIS extensively in several areas i.e. rural accessibility and transport planning, local level disaster management, mapping of infrastructure etc. In addition to in-house use, LGED extends GIS support to various extraneous organizations by providing geographic data and technical support. LGED (www.lged.gov.bd) website provides detailed information about their projects, tenders etc.

Launching of web portals in all 64 districts in early 2010 was a big push in term of introducing thoughts of providing government services through ICT channels. Although initial focus is on pulling basic information about district administration and about the services, it is very at the beginning important to change the mindset of the government officials for real integration of ICTs both at the back and front ends. The process of enriching the websites was chaotic and

sporadic, but effective. The focus on the end products worked very well compared to well-strcutured system. This mental breakthrough is an important readiness element for massive restructuring in business process of the local government, which will be necessary in near future.

The webportals for Upazilla Parishad are underway and gradullay it will go upto the Uniona Parishad levels.

Public Access venues: Considering the low level individual access to ICTs, particularly computer and the Internet and low level of literacy (including functional literacy), public access venues will remain important access points of accessing information and services by the citizens. Although non-government sector is the pioneer in creating public access to ICTs in rural areas for providing livelihood information and services to citizens in Bangladesh, the current government has taken a massive initiative to establish public access to information and services through ICTs in all local government bodies, viz., Zilla parishad Complex, Upazilla parishad Complex and Union Parishad Complex.

At present Union Parishads with support from NILG (National Institute of Local Government) and A2I have already established 1,100 Union Information and Services Centers (UISC) and covered all 4,500 Union Parishads in the country by the end of 2010. These information access and/ or delivery points are designed to ensure citizens' access to information, collect information and services related to livelihood and other relevant issues. 10 Agriculture Information and Communication Centers (AICC) in village and union levels by Ministry of Agriculture and 30 Fisheries Information and Communication Centers (FICCs) in upazilas by Department of Fisheries are currently in operation.

Such massive drive has been made consciously to create initially impact through quantity and gradually focus on quality will be shifted. Such quick drive will create cases of failures, however, this 'big bang' approach will create awarenss among the citizens in the country and all government officials upto the Union Parishad levels that ICTs are relevan to their lives and all government officials will have to take part in the transformation of the government agencies into an integrated system. Any failure will thus open avenues for identification of localized solutions and actual functional deployment will be much easier.

At the district level the approach is to establish one-stop service centre for delivering services to citizens. The process of establishing one stop service centre has already begun and the first such centre was established in Jessore in September 2010. District Administration of Jessore with assistance from A2I has introduced the first one-stop service center in the country. Digital methods have replaced most of the conventional service delivery methods in the one-stop center and consequently reduced both time and hassle for the citizens to avail services from the Deputy Commissioner's office.

Institutions and Individuals: Building quality and committed human resource remains a challenge for implementing Digital Bangladesh agenda. Instead of botto up approach, a top-

bottom process was followed, Access to Information Programme organized series of programmes from the top echelon of the government. Since 2007, the A2I has been working in this direction. As a result, high level commitment was possible to ensure from the level of secretaries up to the level of Upzilla Nirbahi Officers. Furthermore, specific engagement programme was also there for elected representatives in local government institutions, including the union parishad leaders. Besides these, in each Ministry, one focal point have been appointed, who are This engagement initiative is giving dividend. This e-leadership skills development programme is believed to take forward and support the e-governance initiatives across the country.

E-initiatives at the local government level: There are number of local government level e-initiatives, which are creating examples and inspiration to others and a sense of competition has been created. For example, Bangladesh Rural Development Board (BRDB) has developed its website (www.brdb.gov.bd) where users can access information about the organization and its services. It is also planning to implement a semi-online payment system for their micro credit beneficiaries and develop an on-line database of its micro-finance program beneficiaries which would be accessible by all. Rural Development Academy (RDA) is utilizing mobile technology in one of its projects called "Rural Plant Clinics" where farmers send pictures of their plants from their mobile phones and receive prescriptions from professionals. RDA website (www.rda.gov.bd) includes information about their training and research programs, publications, recruitment etc. Bangladesh Academy for Rural Development (BARD) offers ICT-based training courses for government officials. It provides information about its programs and events, publications through the website (www.bard.gov.bd) and shares the newsletter on-line.

Dhaka, Chittagong, Sylhet, Khulna and Rajshashi city corporations have launched on-line portals/websites. Among these five portals, the website of Sylhet City Corporation (SCC) delivers mainly information about the city and corporation and its various functions. DCC, CCC and RCC have launched Electronic Birth Registration System (EBRS). RCC has developed an exemplary on-line portal (www.erajshahi.gov.bd) for both service and information delivery. The websites also publish tender notices and submission and citizen feedback system. DCC, SCC, KCC and RCC are also working on developing an on-line financial transaction system to collect utility bills through the website and an on-line holding database which would be updated regularly. Tender application can be downloaded from the website and submitted by e-mail to concerned officials. The DCC has a GIS-based holding database. DCC introduced call centers/ help line for citizens to have information on services and also scope for complaints. Chittagong City Corporation (CCC) is mostly active in digitalizing their health services. Software package is being used in patient's registration and record keeping for health care services provided in Memon Maternity Hospital. CCC is planning to automate several departments including Tax Collection, Accounts, Human Resource Management, Disaster Management etc.

Most of the municipalities are equipped with computers, and a few of them have internet connectivity. Most of the large (A category) Porashavas use software packages in various areas e.g. accounting, payroll, inventory. Some Pourashavas also use AutoCAD for drawing of development/ construction plans. Large municipalities like Tongi (www.tongimuniciality.com) , Bogra (www.bogra.info) have their own websites.

Citizens' readiness: The citizens' readiness is improving through increased access to mobile phone and Internet through public access venues as well as private possession. The activities of various NGOs, nmedia and government institutions played an important role in creating demand for online services. The establishment of UISCs will further increase awareness about scope of accessing services through ICTs.

Overall readiness for local government is moderate considering the big-bang approach in creating public access to ICTs and existing examples of e-initiatives. Most importantly, the 'Digital Bangladesh" agenda and enthusiasm among the government officials at all levels would be very important for realizing the strategic priorities.

Key Strength and Opportunities	Key Challenges and Risks
• High level of commitment among the elected representatives and government officials at local levels • Active and vibrant private sector and no-government sector willing to work together with the government for creating effective service delivery through LGIs • Budgetary allocation for e-initiatives • Initiative on the way to create high quality connectivity network • Motivated and experienced private sector and non-government players for public-private partnership in creating sustainable public access to ICTs • High level of penetration of mobile phones in the hands of population	• Pilot approach in e-initiatives in LGIs • Inadequate human resource in LGIs, particularly in Union Parishads • Inadequate preparation in sustainability of the e-initiatives • Inadequate capacity to support large network of public access venues • Lack of proper communication to citizens of 'big-bang' approach in creating public access venues in LGIs • Failure in giving taste of real benefits to citizens of the ICT-based initiatives

STRATEGIC PRIORITIES

Based on the readiness of the local government agencies and citizens, strategic priorities are identified for immediate action, midterm action and long term planning. In building an information and knowledge system for citizens, local government agencies are to be key components. The specific projects and programmes will be implemented directly by the government agencies through allocation in revenue and development budget as well as through public-private partnership. The efforts of the private sector and non-government sectors will be integrated for leveraging already invested resources by these entities.

SEAMLESS NETWORKED INFORMATION MANAGEMENT SYSTEM

One of the immediate strategic priorities is to create a seamless vertical and horizontal reliable and high speed connectivity among the local government and central government institutions and agencies. Such network will help decision making and implementation process quicker. More importantly, inter and intra-agency horizontal and vertical electronic connectivity increases operational efficiency as well as simplifies decision-making processes.

INTEGRATING ICTS IN THE OPERATIONS OF L OCAL GOVERNMENT BODIES AND AGENCIES

Another key strategic priority is to integrate ICTs in local government institutions for back office automation so that front end service delivery is possible through one-stop windows. Paper-based procedures will be replaced gradually through automation and digitalization of all data and records. Application of ICT in office processes such as computerized billing system, inventory management, computerized data entry etc. can help establish more efficient service delivery regime at local levels. Use of ICT in communication i.e. through e-mails, on-line blogs and notice boards, mobile phone and SMS etc. and knowledge management i.e. databases, digital copies of documents instead of paper, digital archives etc. will significantly improve efficiency of the LGIs by simplifying communication, document searching, decision-making etc.
In addition to automation of processes inside the local government bodies/agencies, a digital framework or common platform will be developed which will enable the bodies to interact with each other smoothly.

Application of ICTs in local government resource management may enhance its capacity of service delivery by improving its overall resource management system. LGIs are mandated to manage some common pool resources like haat-bazaar, khasland, water bodies like dighi, khal etc. At the same time they also receive various kinds of grants from government and other sources. For example, digital database and GIS-mapping of public shops and markets in a City Corporation will simplify keeping track of the number and locations of shops and markets, leasing out process and collecting rents.

In order to reap the benefits of ICT-based office procedures, it is imperative to develop capacity and skills of the government officials in ICT. Government officials and elected representatives of local government bodies in both urban and rural sectors should be given training to develop ICT skills and adaptability to the change in old system.

INFORMATION AND SERVICE DELIVERY

Creating the scope for service providers to deliver services and disseminate information and for citizens to avail services and collect information using multi/ alternative channels like Community e-Centres, cellular phone messages, community radio and television as per their convenience is a top priority. Local government service delivery bodies such as WASA can disseminate information such rates, bill payment methods, emergency contacts etc. and provide service such bill collection, application for new connection using ICT tools. City

corporations can provide information and deliver services such as renewal of trade licenses through websites and mobile phones.

One stop services/ help desk in unions, upazilas and districts will enhance citizens' access to services. These will create multi-layered delivery points from the service providers and realize the government's goal for increased decentralization. However, in designing and expanding the network of one-stop-service delivery system, selective and 'grow round the crystal'

The information and service delivery system shall focus on education (e.g. formal, non-formal and technical/ distance learning), health-care (e.g. healthcare management, telemedicine), agriculture (e.g. pesticide, high-yielding cropping), disaster (e.g. preparedness etc.), self-employment creation, government services, human rights protection and so on.

Community e-Centres in Upazilla Complex and Union Infomration and Service Centres in Union Parishad Complex are envisaged to be key information dissemination and service delivery points for rural and peri-urban citizens. Such centres are to be run with participation of private sector and non-government organizations for efficient operation and socio-economic viability. Fostering public-private partnership will be the key for maintaing a large network of such centres.

Furthermore, information and service delivery through mobile phone, as a supplement to the physical location based information and service delivery points – is a part of strategic priorities. In a few cases, service delivery will remain with the central government agencies or local government agencies, however, in most cases – scuh service and information delivery system will be developed through public-private partnership. The private sector and NGOs will be encouraged to come forward with innovative proposals and various incentive mechanisms will be devised for attracting private investment.

For ensuring inclusiveness of such information and service delivery model, considering the low ability to pay for various services by the poor citizens and also due to the government's commitment towards public goods approach, the information and knowledge system for information and service delivery will be designed in such a manner that poor are not excluded.

Specific programmes and initiatives for women, children, landless, disabled, indigenous people and other marginalized groups will receive priority by the government.

PARTICIPATORY GOVERNANCE

For making local government accountable and participatory integration of ICTs may be more effective. The system of publishing decisions from the meetings of various committees of local government institutions may ensure two things: making local government more functional and ensuring participation of citizens in the decision making process.

The web portals of local government institutions and RTI component in it will provide opportunity to citizens to seek information as well as opne scope of pro-active information

disclosure. Citizens will be able to seek information form the public access venues or through accessing mobile phone based services. A system of citizens' complaints, feedback with appropriate linkage with decision making authorities would help administration and the government to understand citizens' sentiment and take appropriate course of action.

Interactive and responsive service delivery mechanism with citizens' inputs and feedback will ensure better service delivery by the locally elected bodies and administration. Decision-making meetings can be arranged through web conference to include greater number of people in remote areas. The websites of the Local Government (LGD) and it various divisions can be used for online surveys to learn about citizen's opinions.

Transparent and participatory budgeting process, starting from the ward level to city corporations and from unions to district levels will establish an environment where citizens will effectively take part in the policy/ legislation development consultations or the decision making process as a whole. Learning about citizens' perception about new government rules, laws or projects also help reflect citizens' viewpoint in government functions. Citizen views can be collected by surveys and polling through websites and mobile phones. LGIs will be working on behalf of the citizens' to facilitate delivery of services by various service providers.

PARTNERSHIP STRATEGY

Enabling local government institutions for improvement of efficiency and information and e-service delivery public-private partnership can foster quick progress. Particularly, partnership with institutions like insurance companies, banks, agricultural input suppliers create a portfolio of e-services and goods, which would ensure both social and economic sustainability of the union information and service centres. The ICT industry and NGOs will be invited to propose public-private partnership initiatives to create citizen services and offer on a commercial basis. In sharing the experiences and mentoring the newly appointed entrepreneurs, members of Bangladesh Telecentre Network (BTN) will be engaged. Furthermoe, the district resource centres created by BTN or similar hubs ar Upazilla levels will be engaged for providing technical and trouble shooting support to the local government offices at the grassroots level.

KEY INDICATORS FOR MEASURING PROGRESS

- Number and share of local government institutions connected into high speed inter-agency network
- Number and share of LGIs with information management system at the back-end
- Number and share of LGIs with front-end one-stop service delivery points

3.III. PRO-CITIZEN CIVIL SERVICE

KEY PROBLEMS	• Civil service is overly concerned with compliance with rules and record-keeping rather than responsive, transparent service delivery to benefit the citizens • The incentives for innovation within civil service are almost non-existent leading to status-quo execution; seniority rather than performance is rewarded • Decision making is often done based on piece-meal information. Communication within the government is very slow because of dependence on archaic channels. Knowledge management is person-dependent resulting in almost zero institutional memory • ICT is viewed as mostly irrelevant to day-to-day work of civil servants and service delivery
VISION	• The civil service is capable and interested to use ICT tools for management, planning, implementation and monitoring. • Equally, if not more importantly, the civil service recognizes and promotes the potential of ICT tools and avenues for service delivery to citizens by re-engineering business processes.
OUTCOME	Bangladesh civil service transformed into a dynamic and responsive administration which makes informed and efficient governance decisions and delivers services to citizens' doorsteps with minimal cost, time and hassle to the citizens.

STRATEGIC PRIORITIES	• Change management: The introduction and beneficial use of ICT in reforming the civil service and thus creating better service delivery is essentially a change management process. The needs, benefits, vested interests of all those concerned (whether senior or junior) will be given equal attention, in combination with continuous support to experimentation, risk-taking (within acceptable parameters) and learning. • Innovation Fund: The establishment of an Innovation Fund for the civil service may be considered as an encouragement towards easy fund mobilization for experimentation of innovation in service delivery. • One-stop shops: Service delivery centres in district, upazilla offices, city corporations, municipalities and union parishads serving multiple needs of citizens by aggregating many services that originate from different departments of the government. These one-stop shops present significant opportunities for the government to reduce red tape, streamline work procedures, and co-locate services from multiple agencies into one centre. • Paperless office or 'less paper' office: It is important to develop a strategy towards a 'less paper' environment for the civil service. Notable among various priorities are electronically tracking the movement of files, automating the pension processing and payments, electronic submission of Project Pro-forma (DPP) documents from line Ministries to the Planning Commission and electronic review of them during ECNEC meetings along with electronic access to all supporting documents. Modernizing the Secretariat Instructions to keep pace with today's requirements has become essential. • Connecting the civil service: Providing reliable and high-speed connectivity to the civil servants in all tiers within the central and field administration within a defined timeframe needs to be a high priority. Much of the two-way information sharing, knowledge management, collaborative learning depends on connectivity. The necessary hardware and connectivity will be included in the TO&E. • Capacity and leadership development: Mandatory ICT proficiency for all civil servants will be ensured according to ICT Policy 2009. However, the skills will be focused on day-to-day functions and not on generic ICT literacy. Learning environments over the internet, mobile phones, TV and radio will provide anytime, anywhere capacity development opportunities for civil servants. The institutional capacity in the form of e-Governance Focal Points, ICT personnel and appropriate budgetary allocation (5% of ADP and 2% of revenue for ICT spending) will be enhanced.

INTRODUCTION

The Bangladesh Civil Service (BCS), formerly the Civil Service of Pakistan, is an elite civil service that provides administrative and policy support to the Government of Bangladesh. The line of development is ultimately from the forms and practices of the British Civil Service, in particular of the nineteenth century and the Northcote-Trevelyan reforms of that era which inaugurated a tradition of competitive entry through rigorous examination. The force is about one million strong spread across the country and is vital for the country's administration and service delivery. Although non-government organizations have an increasing role in public service

delivery, it is still the civil servants who are predominantly responsible for delivering services including education, healthcare, infrastructure, utilities, law enforcement, etc.

For a very long time, this very important segment of the government has been suffering from poor pay and benefits resulting in degrading public services and arguably an increase in rent-seeking tendencies. The intense focus on procedural formalities and record-keeping rather than customer satisfaction has further contributed to the unresponsive behaviour in civil service. The following table summarizes the current status of Bangladesh civil service and a vision for transformation:

	Current State of Civil Service	**Desired State of Civil Service**
Relationship with citizens	Obedience and, at best, entitlement	Empowerment
Guiding principles	Compliance with rules, record-keeping	Accountability, transparency, participation
Success criteria	Inputs, and, at best, outputs	Outcomes and responsiveness
Incentives	Seniority-based; status quo rewarded; disincentive for risk-takers	Performance-based; reward for innovation and change management
Human Resource Development	Ad hoc; not linked to career planning	Linked to org. development and personal career plans
Leadership development	Accidental	Systematic
Knowledge management	Person-dependent with no institutional memory	Searchable, user-friendly, information-rich KM system

The government recognizes that the presence of a capable, effective, and forward-looking civil service that will be able to implement the Government's pro-poor policies and deliver services efficiently and timely, is a pre-requisite for fulfilling Vision 2021. The National Strategy for Accelerated Poverty Reduction (NSAPR) II revised in 2009 places a strong emphasis on 'Reforming and Strengthening' of the civil service.

The role of Bangladesh Civil Service to implement the Vision for Digital Bangladesh may be considered from two perspectives:

a. The civil service is capable and interested to use ICT tools for management, planning, implementation and monitoring.
b. Equally, if not more importantly, the civil service recognizes and promotes the potential of ICT tools and avenues for service delivery to citizens by re-engineering business processes.

The discourse and strategies on the use of ICTs by the Civil Service have traditionally been limited to the first area. It is only recently that there has been a surge of activities to develop an awareness within the civil servants for the second.

> "The civil service is capable and interested to use ICT tools for management, planning, implementation and monitoring. Equally, if not more importantly, the civil service recognizes and promotes the potential of ICT tools and avenues for service delivery to citizens by re-engineering business processes".

OUTCOME STATEMENT

Bangladesh civil service transformed into a dynamic and responsive administration which makes informed and efficient governance decisions and delivers services to citizens' doorsteps with minimal cost, time and hassle to the citizens.

SITUATION ANALYSIS

The civil service in Bangladesh has been marred by several failed attempts at reform over the years. As a result, the basic nature of civil service has not progressed beyond the hierarchical, inflexible and bureaucratic structure with which it was born during the British rule of the Indian sub-continent. However, the Honourable Prime Minister has recently given her kind consent to a reform proposal, the Reform Agenda. This reform proposal, in turn, has been incorporated in the Civil Service Reform Roadmap, developed by the Ministry of Establishment, which sets a comprehensive and coherent five-year change framework, including specific outcomes, activities and planning, with the ultimate aim of continuous improvement of pro-poor basic service delivery. The Reform Roadmap is the proactive response of the Bangladesh Civil Service to the realisation of Vision 2021 which includes the use of ICTs to improve administrative and service delivery processes.

The same rigidity also prevents the civil servants from new ways of 'seeing' things that are made possible by ICTs. There is hardly any built-in mechanism to reward innovation in the civil service. Innovations, if any, have been typically driven by personal heroic efforts, many of which bring risks to the harbinger of the change. This deters and discourages many reform-minded government officials to take initiative to improve the planning process or the citizens' experience in receiving services from the government. Since innovations depend on personal interventions by senior officials without full buy-in from the service delivery organisations, it has traditionally been difficult to manage the process change necessary to sustain the

innovation. Thus, the innovations have not seen proper institutionalisation and have resulted in only temporary improvements.

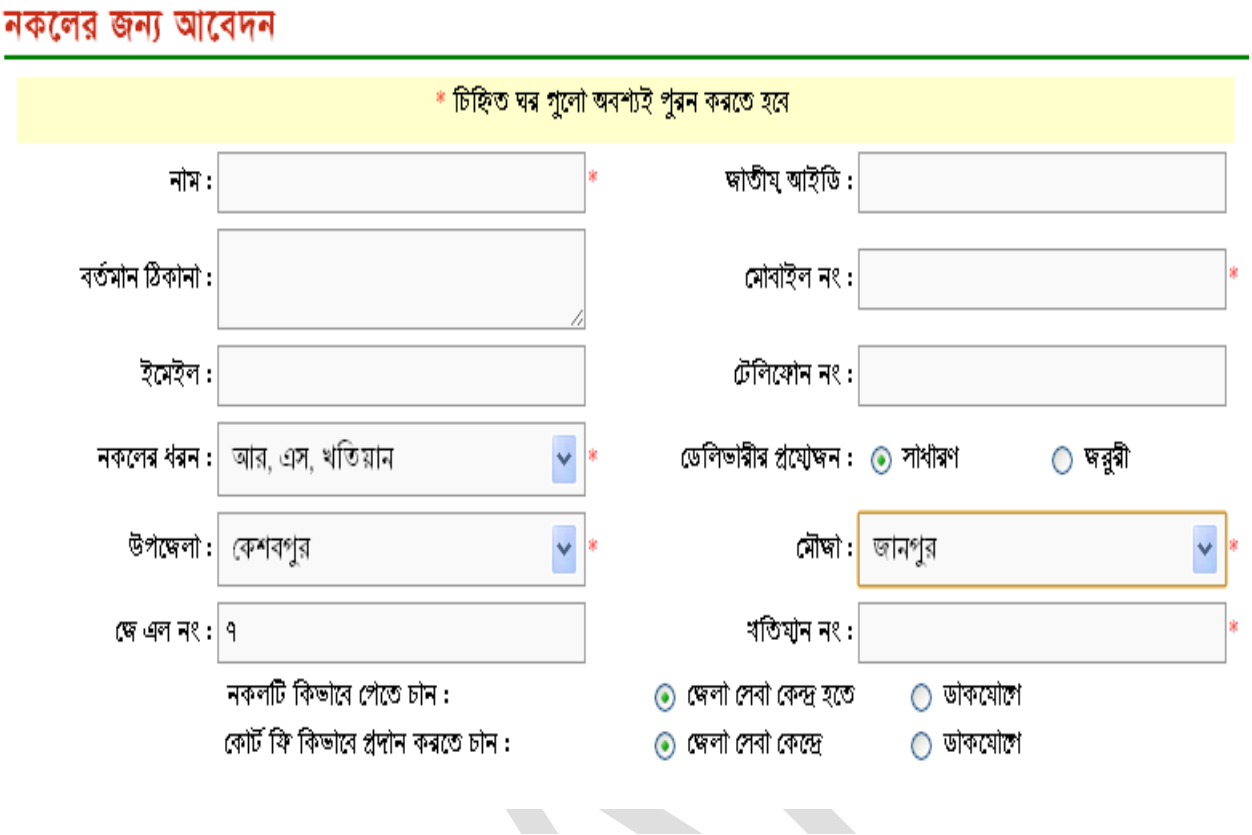
It can be argued that whether the senior government officials type their own letters, presentations or email messages may have little to no bearing on whether ICTs are truly helping in making better and more informed policy decisions and delivering services to citizens faster, cheaper and in a more targeted way. Below is a rough categorization of areas where ICTs can have a positive impact on the civil service:

- Informed decision making: Decision making can be greatly helped with access to information, prior decisions, relevant rules and laws, research and evaluation reports and findings at the fingertips of the decision makers to save time and reduce errors. Scenario analysis software empowers the decision maker with predictive modeling of future scenarios and allows selecting the best possible future.

- Integrated information processing: ICTs allow integration of information platforms across the government so that the right hand indeed knows what the left hand is doing. This can reduce duplication of efforts, wastage of precious scarce national resources, and tighten collaboration and integration among different organs of the government in both the central administration and the field. This is particularly important when more and more functions of the government are being decentralized.

- Access to Information for the citizens: ICTs (web portals, mobile access, radio, TV, etc.) can be the tool of the day for such citizen communication which the government departments are legally mandated to provide.

- Quick and speedy delivery of services to citizens' doorsteps: The introduction of ICTs in circuitous service delivery processes enables civil servants to re-design these processes that suit both their requirements and the citizens' needs. At the same time, by cutting the number of steps and levels involved, e-Services limit the options for corruption dramatically, making service delivery more transparent and accountable.


নকলের জন্য আবেদন

* চিহ্নিত ঘর গুলো অবশ্যই পুরন করতে হবে

নাম : * জাতীয় আইডি :

বর্তমান ঠিকানা : মোবাইল নং : *

ইমেইল : টেলিফোন নং :

নকলের ধরন : আর, এস, খতিয়ান * ডেলিভারীর প্রয়োজন : সাধারণ জরুরী

উপজেলা : কেশবপুর * মৌজা : জানপুর *

জে এল নং : ৭ খতিয়ান নং : *

নকলটি কিভাবে পেতে চান : জেলা সেবা কেন্দ্র হতে ডাকযোগে

কোর্ট ফি কিভাবে প্রদান করতে চান : জেলা সেবা কেন্দ্রে ডাকযোগে

- Engagement with the citizens: In this day and age, the citizens increasingly expect to be engaged in the formulation and implementation of services that affect their lives. The time of 'we-know-what-is-best-for-the-people' and the 'one-size-fits-all' approaches are long gone. ICTs offer appropriate solutions to field officers who need to be in constant touch and communication with their clients, to make certain they understand present needs, anticipate future demand and feed the citizens' feedback into the central policy discourse.

- Close monitoring and quality assessment of implementation: ICTs offer various ways to address the challenges of monitoring in an increasingly decentralized government by allowing decentralized access to enter data and centralized processing of the data. The democratic access to ICTs allows some of the monitoring be done by the citizens or beneficiaries of the service and projects.

- Fast communication within the government: ICTs (internet, intranet, email, shared documents, blogs) can make an important contribution to reducing the physical and mental 'distance' between government and civil service, between central and field administrations, between civil servants and citizens and between different ministries, departments and functional levels.

- Knowledge management within the government: Transfers are a constant phenomenon in the civil service, particularly at the field level. Institutional memory is seriously hampered when a knowledgeable person moves away from the organisation. While ICTs cannot claim to adequately proxy a human being, digital knowledge management

platforms can help capture individual's knowledge, assimilate knowledge from multiple persons and groups, and can serve up this knowledge at the right time to the right people.

- Human resource management within the government: The size of civil service in the past 40 years has increased manifold and managing such a group divided into cadres, sub-cadres and groups has become a promethean job. ICT-enabled systems can keeps track of individual performances, assist in fair and flawless recruitment and rational career planning.

E-READINESS

BEING PRO-CITIZEN

The Bangladesh Civil Service has its roots in an organisation that ruled the country as masters. That colonial concept is no longer valid or relevant in an independent, democratic and rapidly changing country that requires collective and collaborative action of the Government, civil service, private sector, civil society and citizens to solve complex developmental issues. Civil servants have, for the better part, already shed their 'masters mindset', and are trying to recast themselves as servants, always willing and prepared to serve the public better.

This mindset change is almost a pre-requisite if the use of ICTs by civil service is to bring any benefits to the citizens. ICT skills alone in civil service are hardly enough. In fact, as has already been explained before, it may not be necessary for the key decision makers to acquire ICT skills as long as they recognize the transformative and catalytic potential of ICTs. New way of 'seeing' things by senior government officials may be much more important than new way of 'doing' things.

The recent awareness development programmes conducted by the Prime Minister's Office for the civil service focused substantially on the issue of how ICTs can improve the quality of service delivery, at the same time, reducing cost and speed of delivery. The Digital Innovation Fair held in March, 2010, saw a sizeable number of government innovations that improve service delivery using ICTs. The fair created an environment of healthy competition among the Ministries and Directorates of the government and among the civil servants to win attractive prizes for best e-Service delivery. Having realized the catalytic effect of this fair to improve service delivery in a 'natural', competitive way, the government is already planning to hold such fairs at the divisional and district levels and make this a regular feature of sensitization and demonstration of benefits Digital Bangladesh brings to the citizens.

The Right to Information (RTI) Act 2009 is a mandate for the civil service to becoming more pro-citizen in terms of information disclosure to the public. The 64 District Portals launched by the respective DC offices, with facilitation from the Cabinet Division, is a good example of how the field administration has started implementing this very important law. Each Ministry/Division and Directorate has appointed a focal point to implement the RTI Act in its own way. The RTI Cell in the Ministry of Information is providing support to this activity.

ACCESS TO Its BY CIVIL SERVANTS

Due to the decreasing cost of hardware and higher purchase of computers within the government, most officers in the central administration can now access computers if they want to. The computer access for officers in the field still remains much lower than that in the central administration.

Broadband connection is available only at the Ministries/Divisions and some Directorates. It is almost non-existent at the field level offices.

The Government Telephone Policy 2004 has Internet provision only for senior officers and that also is limited to office use. There is no provision for residential use of Internet. The use of mobile phone to access the Internet is strictly outside the government provision. Such cost restriction and lack of provision for home connection limits adoption significantly.

Some development projects have procured computers and Internet connections for government officers in both central and field administrations, but the issue of transferring them to TO&E remains unresolved, which means that these provisions remain uninstitutionalised and will disappear as soon as the projects end.

In the latter half of 2009, the government made a landmark decision to furnish all Secretaries, e-Governance Focal Points (at the level of Joint or Additional Secretaries in each Ministry and Division), Divisional Commissioners, Deputy Commissioners and Upazilla Nirbahi Officers with laptops and Internet connectivity through mobile modems. This decision has addressed a number of issues:

a. The officers are connected 7x24 because of almost ubiquitous coverage of the mobile service providers – this is particularly important for officers in the field who suffer the most from lack of connectivity because of policy restrictions for Internet connections and lack of budgetary provisions. This now allows them to access and share online information anytime, anywhere.

b. Official email addresses for all these officers being maintained by the Ministry of Establishment have introduced the 'digital culture' officially within the civil service for the first time.

c. The battery backup in the laptops ensure that the devices are functional during times of power load-shedding and when the officers are on travel and away from the power grid.

The potential of this connectivity, in terms of communication, creating understanding and collaboration and exchanging knowledge and experience, is huge and has only just started to be exploited.

A large project, called BanglaGovNet initiated by the Ministry of Science and ICT in early 2010, is in the process of taking broadband connectivity to government offices down to the upazilla level. The Cabinet Division, in early 2010, started the process of connecting the Prime Minister's Office and the Cabinet Division to all 6 Divisional Commissioner's offices and all 64 Deputy Commissioner's offices with high-speed video conferencing facility. This will enable the central administration to conduct meetings of national importance with the field administration without any disruption of work or wastage of time on the part of the latter. The by-product benefit of this video conferencing system will be the high-speed broadband network to all DC offices making data sharing between central and field administrations much faster and more reliable.

ICT LITERACY

According to Bangladesh Public Administration Training Centre (PATC), around 70-80% of the entering civil servants are ICT literate. PATC and almost all other training organisations of the government including the Bangladesh Civil Service Administration Academy, Bangladesh Institute for Administration and Management (BIAM), Academy for Planning and Development (APD), Bangladesh Computer Council (BCC) and the ones specialized for sector-related training such as Bangladesh Bureau of Statistics (BBS), National Institute of Local Government (NILG), Bangladesh Bureau of Educational Information and Statistics (BANBEIS), National Academy for Education and Management (NAEM), Press Institute of Bangladesh (PIB), among many others, all impart ICT literacy training. However, the retention of skills and knowledge from these training sessions and workshops is not very high. The major reason for this situation is that most of these training sessions focus on the use of computers and internet in the most general sense and fail to link these skills to their respective work environment and job functions. This, combined with the fact that ICT skills are still not a strict requirement by the government for civil service, leads to demise of these skills in a relatively short time.

A study conducted by A2I programme in 2008 revealed evidence that the use of email by senior civil servants was on the rise but they still preferred to dictate letters and notes to subordinate officers instead of typing by themselves. Expectedly, the more junior officers who had access to computers were using the tools more regularly with about 60% reporting regular use (multiple times a week).

The study shows increasing use of presentation software demonstrating that the government officers, including senior ones, are more apt to making multimedia slide presentation these days. Many senior level capacity development programmes such as Managing at the Top (MATT-2), A2I and foreign study tours are responsible for this uptake in presentation skill building. In many cases, the junior officers are the ones preparing the presentations and so the presentation development skills are higher among the junior officers. The use of spreadsheets is very rare signifying that data processing is still a very low, and sometimes specialized, practice within the civil service. The use of databases to record and retrieve information, even in a small scale, is almost unheard of.

Interestingly, the study revealed that the computer use by the officers in the Ministry of Establishment was much lower in all categories compared to officers in most other agencies of the government. This is an important point to note since this Ministry is the one responsible for career movement and capacity building of the Administration cadre, the most influential of the cadres in the civil service.

ITEGRATED DECISION MAKING

Most information in government organisations today represent silos of knowledge not integrated for the most optimal decision of the government. It is because the information is in physical files or, in limited cases where it does exist electronically, the databases and knowledgebases are disjoint. They also follow a variety of technical formats that make interoperability of documents, information and data virtually impossible. The Access to Information (A2I) programme of the Prime Minister's Office is developing the necessary standards in the form of an e-Governance Interoperability Framework (eGIF) and National e-Governance Architecture (NEA) to bring interoperability to government documents, databases, websites, portals and e-services to all major government databases that need to share data for integrated decision making. The Planning Commission and the Cabinet Division, in collaboration with a number of government organisations, are in the process to adopt these standards and implement them across the government. More elaboration on these can be found in the Enabling Environment chapter of this document.

INSTITUTIONAL REFORM

Transition of the Bangladesh Civil Service from a top-heavy administrative machinery into a pro-poor catalyst to improve service delivery lies in developing and orchestrating a change management approach that embeds itself in the organisation. This organisation is proud of its pedigree, its shared values and its organisation identity. Traditionally, an analysis of the

Bangladesh Civil Service tends to focus upon all that is wrong with the service. However, the recent efforts to develop the Civil Service Reform Roadmap have bucked the trend and concentrated on reconciliation of the old ideals and values, on which the sense of pride and organisational identity is based, with the radically changed internal and external environments. The Ministry of Establishment has taken a collaborative, organic approach to developing a change management programme with the civil service in different tiers. The programme has avoided over-planning things and focused on educating stakeholders of the complexity of the interventions, identifying internal opportunities for change and assisting in setting up the right conditions for these emerging possibilities to grow, blossom and endure.

The Prime Minister's Office and the Ministry of Establishment, assisted by the A2I programme and the Civil Service Change Management Programme (CSCMP) respectively, have left much scope for creativity and risk-taking for a trial-and-error approach to improving service delivery and administration through the use of ICTs. The 53 Quick Win activities launched by A2I and led by each individual Ministry/Division are an example of such trial-and-error style. The government fully realizes that some ideas will work, while others will fizzle out for a number of reasons, but the failures will not be marked as 'failures' but as 'lessons for improvement or re-design'.

Key Strength and opportunities	Key Challenges and risks
• The Civil Service Reform Agenda approved by the Hon'ble Prime Minister takes a change management approach to civil service reform and places heavy emphasis on ICT as a tool of reform • The RTI Act and the Citizens' Charters already developed by most government organizations serve as great enablers for launching e-services • The Quick Win initiatives have created a small appetite for innovation in service delivery. This appetite can be used to generate momentum for institutionalizing innovation. • Access to hardware and internet by civil servants in the field is increasing rapidly	• The service delivery mindset of civil service is still not citizen-friendly • The service delivery process is over-focused on rules and under-focused on results and customer satisfaction • The incentive system of civil servants is not performance-based or citizen-focused • Innovation is discouraged • Most civil service institutions have become weak • ICT capacity development approach for civil servants is misplaced • ICT equipment and personnel are mostly not included in the TO&E • Most databases and ICT systems are non integrated with each other

• ICT Policy 2009 encourages ICT spending by each government organization upto 5% of ADP and 2% of revenue budget • The newly approved PPP Policy can facilitate meaningful involvement of the private sector in public service delivery	

STRATEGIC PRIORITIES

CHANGE MANAGEMENT TO INSPIRE CIVIL SERVICE FOR IMPROVED SERVICE DELIVERY

The introduction and beneficial use of ICT in reforming the civil service and thus creating better service delivery is essentially a change management process (instead of a technical one that focuses on short term gains). Therefore, the principles of modern change management apply (as opposed to change management as an engineering technique). ICTs, positioned as new ways of 'doing things' as well as new ways of 'seeing things', will make the greatest impact for civil service. The needs, benefits, vested interests of all those concerned (whether senior or junior) should be given equal attention, in combination with continuous support to experimentation, risk-taking (within acceptable parameters) and learning.

It is important to ensure that the conceptualisation, development, implementation and evaluation of e-Service delivery is an inclusive and participatory process, and that the relevant stakeholders are actively involved and engaged. This will, in turn, guarantee relevance, sustainability, shared ownership and responsibility, and ultimate scaling up. It is also useful that each e-Service incorporate a communication strategy, aimed at creating momentum and commitment. The establishment of an Innovation Fund for the civil service may be considered as an encouragement towards easy fund mobilization for experimentation of innovation.

CREATING ONE-STOP SHOPS

The idea of 'one-stop shop' is to develop service delivery centres that can serve multiple needs of citizens by aggregating many services that originate from different departments of the government. The establishment of district and upazilla one-stop service centres (launched in Jessore in September, 2010 and to be expanded to all DC offices), Union Information and Service Centres (UISC) in all 4,500+ Union Parishads by November, 2010, Agriculture Information and Communication Centres (AICC) and Fisheries Information and Communication Centres (FICC) in different parts of the country are a good examples of one-stop shops which cater to various needs of the citizens ranging from agriculture-related information and services including market information, soil testing, crop diagnostic services, fisheries and poultry-related information, job market related information, advice on legal and human rights issues, in

addition to pure ICT-based services such as email, chat, Internet browsing, digital photography etc.

The civil service is experimenting with such 'development cybercafes' from a multitude of Ministries including Agriculture, Fisheries and Livestock, Science and ICT, Posts and Telecommunications, Education, Local Government Division, Cabinet Division in as varied locations as Union Parishads, Upazilla Parishads, DC offices, UNO offices, post offices and schools. Dhaka City Corporation has opened a voice-response based Citizens' Help Centre to serve vital information over the phone. These one-stop shops present significant opportunities for the government to reduce red tape, streamline work procedures, and co-locate services from multiple agencies into one centre.

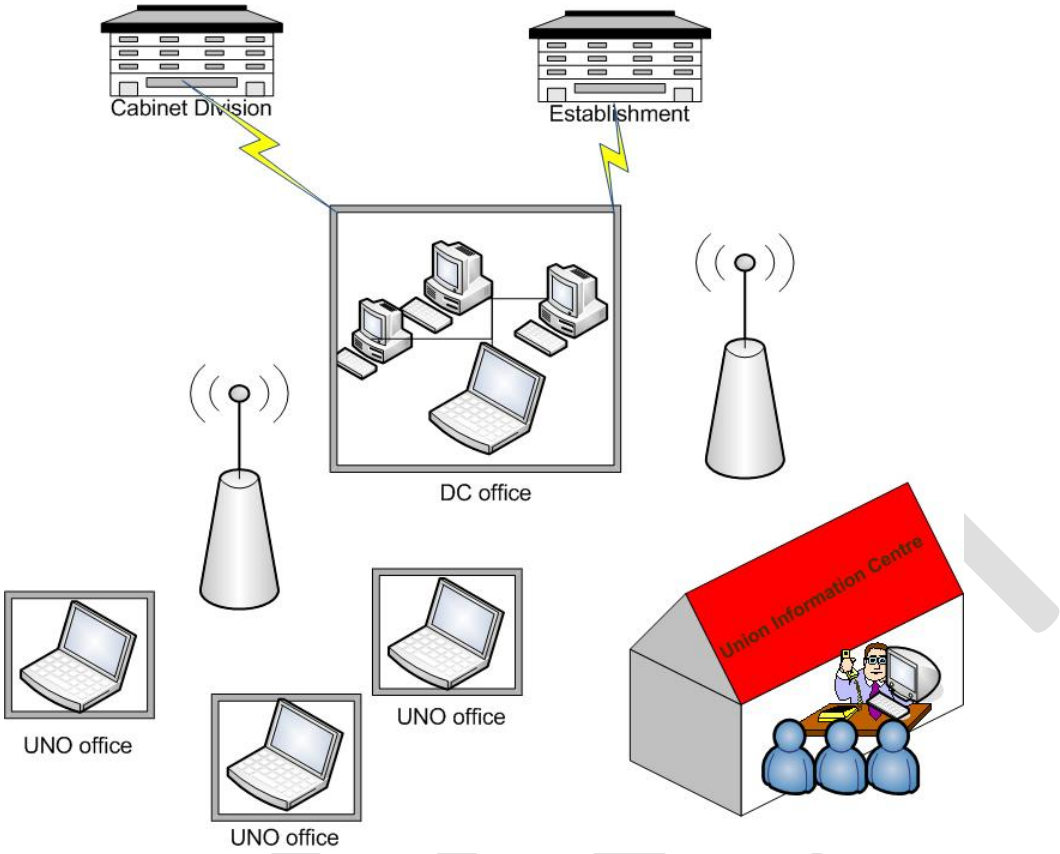
CITIZENS CHARTER AS A POINT OF DEPARTURE FOR ENSURING ACCOUNTABILITY

The Public Administration Reform Commission (PARC) in 2000 made a recommendation that "Citizens' Charter should be introduced in all service-rendering public organisations to enable citizens to know their rights and to ensure the commitment of organisations to their service delivery and assure value for money". Almost all agencies of the government prepared Citizens' Charters by the middle of 2008. It is now essential to develop tracking mechanisms around the Citizens Charters and publish results on the Internet for all service-rendering public organisations. Reporting around Citizens Charter can also be encouraged by citizens and media to develop citizens report cards over time.

PAPERLESS OFFICE OR 'LESS-PAPER' OFFICE

The goal of paperless office within the government is unattainable in most countries, especially in countries with an intensive need for record-keeping on paper and legal support for evidence still being paper-based. What is, however, practical, is to develop a strategy towards a 'less paper' environment for the civil service. There is probably no alternative to doing some experimentation in this regard to identify what would work in different office environments which vary radically depending on the nature of work and from central to the field.
Starting to electronically track the movement of files may be a worthy first step, already being piloted by several Ministries. Automating the pension process, prone to significant hassle and delay, will be hugely attractive to the civil servants, especially the senior ones. Another promising area is to allow Development Project Pro-forma (DPP) documents to be submitted electronically from line Ministries to the Planning Commission and reviewing them during ECNEC meetings electronically along with electronic access to all supporting documents. Modernizing the Secretariat Instructions to keep pace with today's requirements has become essential.

CONNECTING THE CIVIL SERVICE



Providing reliable and high-speed connectivity to the civil servants in all tiers within the central and field administration within a defined timeframe needs to be a high priority of the government. Much of the two-way information sharing, knowledge management, collaborative learning depend on connectivity. In this regard, the Domestic Network Coordination Committee, chaired by the Principal Secretary, needs to play a guiding role. Also, the projects that are tasked to deliver this connectivity need to be expedited as much as possible.
To ensure their continued maintenance and replacement, the laptops and modems given to the Secretaries, e-Governance Focal Points, Divisional Commissioners, DCs and UNOs, need to be included as soon as possible to TO&E.

Given that 90% of the Internet connectivity in the country currently depends on mobile modems, the Government Telephone Policy 2004 must be amended to include a paid provision for civil servants on the use of mobile phones for Internet access. Perhaps a ceiling may be determined based on grade level; it is likely that combining the current ceilings for home phone use and mobile phone use to create a new pooled ceiling of phone cum mobile phone cum Internet usage can come at no additional cost to the government.

CAPACITY BUILDING AND E-LEADERSHIP DEVELOPMENT

In terms of human resource development, the role of ICTs is much more supportive than transformative. The excessive centralisation of training opportunities in Dhaka denies huge number of civil servants from the much-needed learning opportunities. Modern ICTs play a crucial role in making learning more efficient, by providing learning opportunities over the Internet, mobile phones, TV and radio, distributing learning modules to local coaches, providing easy-to-carry learning materials for mobile training centres, access to academic journals etc. In addition, ICTs can also enable linking of the received training, through a Digital Human Resource Management System, to effective career planning, talent management, sensible transfers and transparent promotion.

Regarding use of ICTs for service delivery, the A2I programme has already started many initiatives within the civil service. More important than the specifics of most of these initiatives, which still have to prove their sustainability and scalability, is the fact that they have succeeded in sensitising, convincing and motivating large groups of high-level civil servants of the potential benefits of ICTs to create immediate (and easily realisable) improvements in performance and service delivery, securing early buy-ins and thus creating an influential legion of champions. This is a major phenomenon, more important than the actual amount of hardware and specific software applications. This e-leadership development process must continue, possibly through a level of institutionalisation by the recognized training organs of the government. However, it is vital to ensure that such institutionalisation does not inadvertently force the currently dynamic e-leadership development process to atrophy into a mechanised, lifeless, 'one-size-fits-all' form.

The ICT Policy 2009 has included a few specific action items which, if implemented, will move the civil service forward in regards to its ICT skills relevance and need:

- Action Item 88: Mandate basic computer and Internet literacy for all Class I and II appointments in all public sector organisations for practical examinations (before viva voce).
- Action Item 89: Add a 50-mark examination (to the current 300-mark examination) for applied computer and Internet literacy for senior scale promotion examinations for cadre services.
- Action Item 90: Ensure no promotion to national pay grade 1 and 2 without demonstration of basic computer and Internet literacy.
- Action Item 91: Insert new criteria for assessment of basic computer and Internet literacy in the ACR.
- Action Item 92: Cease new stenotypist recruitment in the government. Convert all existing stenotypists to data entry operators through proper training.

- Action Item 93: Redesign ICT and e-Governance curriculum of government training academies with a distinct focus on change management and process re-engineering.

DEVELOPING THE INSTITUTIONAL ICT SUPPORT CAPACITY OF THE GOVERNMENT

It has long been realized by the government and ICT industry alike that the ICT support capacity of the government is woefully inadequate. The ICT systems are generally developed within the framework of projects. As soon as the projects end, the government is unable to retain much of the technical staff. The headcount of ICT support personnel in the entire government is less than 200 as reported by Bangladesh Computer Council during the Digital Innovation Fair 2010. To make matters worse, the archaic Computer Personnel (Government and Local Authorities) Recruitment Rules 1985 has provision for designations that have no relevance in the 21st century work environment where the civil service functions today, and lacks provisions for personnel truly needed to support the dynamic and constantly changing ICT environment.
To address this issue, it would be vital to implement the following action items of the ICT Policy 2009:

- Action item 96: Develop ICT Cell for all public sector organisations to be run by ICT professionals. Create ICT posts for this Cell.

- Action item 97: Develop career ladder (including in situ promotion) and special compensation/incentive packages to be offered to the ICT professionals of all public sector organisations comparable to those of private sector.

- Action item 98: Develop shared services for supporting and maintaining technologies within the government (system analysis, process re-engineering, support, maintenance, upgrade, project management) with additional technical allowance for ICT personnel.

The government has benefited from introducing the concept of e-Governance Focal Point at the level of a senior policy maker (Joint or Additional Secretary) in each Ministry/Division. This is akin to the concept of the Government Chief Information Officer (GCIO) in many countries. Implementing action item 95 – "Develop institutional buy-in, incentive mechanisms and leadership for leveraging ICTs for service delivery with appropriate modifications to the Terms of Reference of e-Governance Focal Points and budget authority on the ICT part of the agency budget" – will be important to make the e-Governance Focal Points more effective to support ICT-enabled initiatives of the civil service. The concept of e-Governance Focal Point will be expanded to the Directorate and field level, and the Focal Points paired up the with technical personnel in the respective organisation. The experience of A2I suggests that appropriate capacity building of the Focal Points must be conducted on a regular basis, and any promotion or transfer of the e-Governance Focal Point must trigger training of the replacement as soon as possible.

ENSURING PROPER BUDGET ALLOCATION

The ICT Policy 2009 sets the ceiling of ICT spending by each government organisation to 5% of ADP and 2% of revenue budget by the end of 2010. This is far from being realized – the three fiscal years between 2004 and 2007 indicate an ICT spending of 0.3-0.4% excluding major infrastructure investments such as digital telephone exchanges and submarine cable. It is essential, in the immediate term, to mobilize planning wings of line Ministries/Divisions/Directorates, in collaboration with the Planning Commission and Finance Division, to develop ICT-enabled projects for service delivery and administrative automation.

PARTNERSHIP STRATEGY

Much of the ICT funding, especially in ICT infrastructure, can come from private sector even for delivery of government e-Services. A major bottleneck lies in the traditional mistrust and antagonism between the civil service and private sector/non-government sector. Recent collaboration between the public and private sectors on a number of initiatives, especially the Quick Wins for e-Service delivery, has demonstrated symbiotic relationship between the two sectors towards greater financial sustainability and shared ownership. The public private partnership (PPP) Policy, Strategy and Guidelines developed by the government will further ease such partnerships by providing guidance around the exact nature of relationship and scope of responsibilities of each partner.

INDICATORS MEASURING PROGRESS

- Number of citizens benefiting from e-services
- Number of active e-services
- Customer satisfaction rating on public service delivery
- Percentage of government organizations using searchable databases for administrative decision making
- Percentage of civil servants who championed ICT-enabled service delivery in the last 12 months
- Percentage of civil servants using ICT-based communication within the government
- Percentage of civil servants using ICT-based knowledge management within the government
- Percentage of government organizations using ICT-based human resource management tools

3.IV. INCLUSIVE BANKING AND ACCESS TO FINANCE

KEY PROBLEMS	• Outdated legal and regulatory regime • Majority of the population is out of banking system • Difficulties in including rural clients due to lack of 'Know Your Client' (KYC) Guideline for rural population • Cash based economy • Robust e-payment system is still to come
VISION	Inclusive banking with efficient e-payment system and equitable access to finance, particularly for the marginalized population.
OUTCOME	ICT-oriented legal and regulatory reform enables all citizens to access banking and financial services where KYC procedures are not a barrier to access to finance.
STRATEGIC PRIORITIES	**PAYMENT AND TRANSACTION** The government will set up electronic interbank transfers and gateway to ensure seamless transaction with unassailable security. Domestic and international money transfer and payments will be made through e-payment and m-payment services. **ACCESS TO BANKING AND FINANCE** Using ICT and KYC using NID towards a tiered approach for reduced cost of banking for rural customers. To bring down transaction costs, customers data preservation, for better services and for better monitoring MFIs will use ICT. **ICT-ENABLED BANKING** The central bank will undertake reform measures to make the laws and regulations guiding the banking industry suitable for banking and payment through Internet and mobile phone. In designing reform for banking and financial transactions, bank-led model rather than mobile operator-led one will be utilized. **INTEROPERABILITY** To accommodate latest form of technologies all banks will work towards developing a standardized and core banking platform led by the government. Interoperability will ensure seamless interbank transfers. MRA will make sure MFIs standards in compliance with an interoperable mechanism.

INTRODUCTION

An efficient and robust banking system is a critical enabler for growth of business sector in any country. There are 48 scheduled commercial banks in Bangladesh, of which four state-owned banks, five state –owned specialized banks: thirty private commercial banks and nine foreign banks. Bangladesh Bank regulates these scheduled commercial banks. There are 298 micro-credit institutions regulated by the Micro-credit Regulatory Authority (MRA) set up in 2006.
A well networked banking structure that focuses on efficiency and serving the consumers not only helps facilitate business but also helps create a robust capital market. In Bangladesh, although there has been significant growth in private sector banking, the access to formal banking has remained limited to only 13 % of the total population [???]. The indications are that the policy makers have taken notice and there is currently increasing focus on how to change that statistics and bring more people under the banking umbrella.

In his recent speeches, Bangladesh Bank Governor has stated that Bangladesh Bank wants to energize the banking sector by turning it into an efficient, speedy and a citizen friendly sector. The vision of the public banking sector in Bangladesh is creating a more inclusive banking sector that will reach out to the unbanked. There is a large segment of the population that, in spite of being the engine of growth in this country, is excluded from formal banking. As a result, they are not only getting deprived from additional financing options but banks are also losing out due to the lack of use of their idle money. Along the same lines, the vision of the Bank is to have a payment system that will provide maximum benefits, cost and convenience wise, equitably across society and will provide the flexibility to respond rapidly to advances in payment technologies, system and service offerings. Therefore, the two main goals in the sector can be articulated as:

1. **Creating an Efficient Transaction and Payment system** - Creating an efficient transaction and payment system, that reduces people's hassle and cost and increases its speed and security

2. **Ensuring Inclusive Banking** -. Creating an enabling environment where a large segment of the population has access to quality and equitable banking and financing services.

It has always been argued that higher transaction cost has made it impossible to penetrate the rural and relatively less affluent consumer base. However, that is about to change with the increasing use of technology in banking and payment structure.

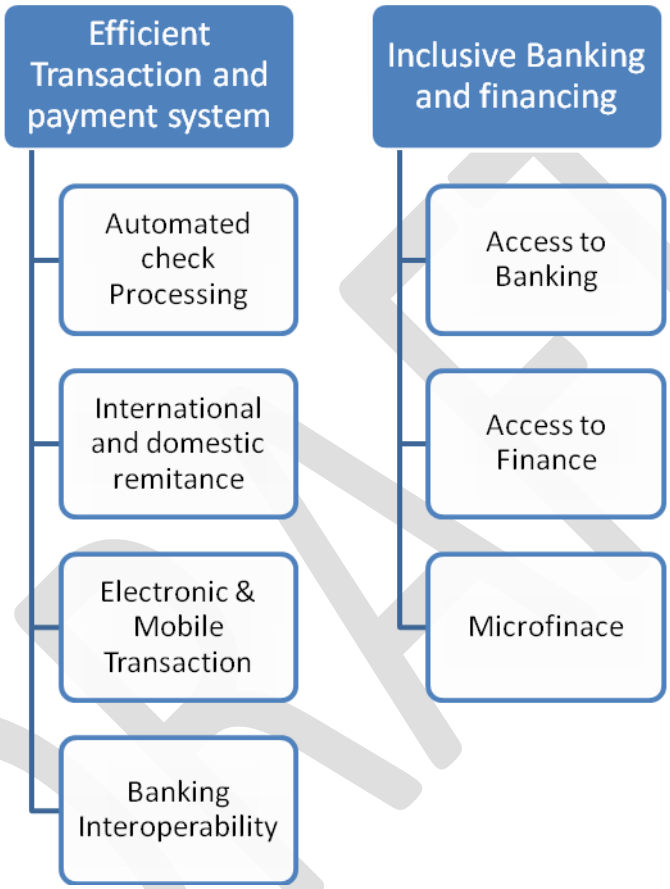
VISION

Inclusive banking with efficient e-payment system and equitable access to finance, particularly for the marginalized population.

OUTCOME STATEMENT

ICT-oriented legal and regulatory reform enables all citizens to access banking and financial services where KYC procedures are not a barrier to access to finance.

SITUATION ANALYSIS



LEGAL AND REGULATORY FRAMEWORK

The current banking system is governed under The Bangladesh Bank Order (BBO), 1972, the Banking Companies Act, 1991, Negotiable Instruments Act, 1881, The Insolvency Act, 1920, The Financial Institutions Act, 1993, the Foreign Exchange Regulation Act, 1947, the Banking Department (BD) Manual and the Dhaka Bankers Clearing House Rules. The current thinking among the banking experts is that the legal frame work needs to be updated to accommodate the new developments, both technological and regulatory, that have fundamentally altered the sector. For example, even though Automated Clearing House is using scanned images of checks but there is no legal framework to use scanned images, instead of a real cheque, as evidence in the court of law. Such gaps need to be filled.

EFFICIENT TRANSACTION AND PAYMENT SYSTEM

From Cash Dominated Current Payment System to quicker check processing: The current payment system is predominantly cash based with only a small percentage of the population having bank accounts. Bangladesh Automated Clearing House (BACH), an advanced cheque processing and electronic imaging system, electronic fund transfer (EFT) are in operation from October 01, 2010. Under the new system all banks issue now standard MICR cheques to the customers. Although there are enormous advantages of cooperation to develop modern payment system infrastructure, the market has only very limited inter-bank cooperation in development of common-use infrastructure. There is currently no comprehensive electronic inter-bank network to facilitate faster and more secure interbank transactions.

INTERNATIONAL AND DOMESTIC REMITTANCE AND PAYMENT FOR E-COMMERCE

E-commerce: Because of the extreme dependence on cash, the technological innovations still has not borne any fruit in easing domestic money transfer. Legal barriers have been lifted in making online commerce and transaction possible. The digital signature system is being developed and expected to be in place by early 2011. Currently two private commercial banks are piloting online transaction via Internet. Once that is enabled, locally issued credit card could be used to make online payments for web-based purchases. This can usher a new development for SMEs. However, when cross-border transaction is approved by the central bank, significant changes in the expanding market access is more likely.

Cheque Processing: Installation of Bangladesh Automated Clearing House (BACH) is another significant development. It simplifes the remittance channel and payment system and, therefore, brings dynamism in business activities. The system started in early November 2009 on experimental basis, participated by some well-prepared banks. Applying sophisticated methods, the system takes only images and corresponding information of the submitted cheque leaves instead of a physical one, and sends them to the Bangladesh Automated Cheque Processing System (BACPS) using a secured communication link. New cheques/clearing instruments (standardized) contain Magnetic Ink Character Recognition (MICR) line that encompasses information regarding the amount, transaction code; clients account details, routing number (numeric code assigned to bank branches for easy identification of origin and destination of the instrument), cheque leaf's serial number and so on. The system supports both intra-regional and inter-regional clearings based on a centralized processing centre in Dhaka and designated clearing regions, and promises to conform to the international best practices and cost-effective solutions for cheque processing. Cheque clearing time is expected to be reduced to one day for countrywide payment. In other cases, this will be a matter of couple of hours only.

Remittance: Steps have been taken to make remittance faster through the use of mobile communication technology. There are two banks which are piloting the process currently. The

banks are accepting SMS messages as confirmation along with pin numbers and when the pin numbers are shown by the recipient, money is being disbursed quickly.

Cashless electronic and mobile transaction and payment systems for the future: As the outreach of banks are expanding to a greater segment of the population and the business activities are flourishing in an economy that is growing at a rate of close to 6% every year, it is essential to have a robust transaction and payment system for the future to guarantee a speedy, secure and hassle free service. As Bangladesh Bank is moving forward towards making regulatory changes, private banks are far ahead than public banks in adapting to the changing environment. Beyond what has been already mentioned, Bangladesh Bank is planning on adopting the following milestones in the coming months and years.

- Electronic Fund Transfer System Production
- Mobile Phone enabled Payment Service
- National Payment Gateway/Switch
- Real Time Gross Settlement (RTGS)

Banking Automation and Interoperability: A central bank reform program was initiated in ??? which has an ICT component encompassing networking, banking application, enterprise resources planning solution, enterprise data warehouse etc., with a view to ensuring efficient management of assets, including human resources within the bank. Under the networking programme, all the departments of Bangladesh Bank Head Office and its nine branch offices have already been brought under a computer network (LAN/WAN), connecting almost 3,100 PCs. Therefore, any official sitting anywhere (head office or branches) has access to the same kind of resources, and can share knowledge and information and ensure knowledge based management. Enterprise Resources Planning (ERP) solution covers digitization of procurement (e-procurement), cash management, access control etc. Meanwhile, recruitment process under Bangladesh Bank has been digitized (online application, sorting, validation etc.).

Banking application includes automation of all the accounts with Bangladesh Bank (banks, financial institutions and government), foreign exchange management, currency management, treasury and securities systems/module, public debt management module, and also establishment of a central depository system (CDS) to build a platform for secondary trading of treasury bills and bonds.

Enterprise Data Warehouse (EDW) creates an electronic data bank, which will provide all information and statistics of monetary, trade and fiscal areas of the national economy, where all the concerned people of BB will have access to use it for further policy analyses. Bangladesh Bank is going to commence web based e-tendering system, which covers announcement of tender, distribution of schedules, bidding etc., to ensure simplicity and transparency of tendering process.

ACCESS TO BANKING

Access to Financial Product and Banking Services: With the directives of Bangladesh Bank, financial institutions are increasingly trying to find innovative ways of reaching out to the unbanked population. The key impediment here is the 'Know Your Client' (KYC) Guideline that the banks are required to follow in order to stop money laundering which is quite difficult for rural or poor segment of the population. Often enough, the requirements are not met due to lack of authenticated documentation. Suggestions have been made that using technology, different sets of KYC guideline can be used with limitations on fund transfers. Yet, recently various government subsidies are being given for farmers through banks by letting them open a bank account with 10 taka. Effective utilization of the national ID number/card will prove extremely beneficial to extend such services through banking channel and also to do the required KYC for the banks.

MOBILE BANKING:

The vast majority of the Bangladeshi population lives in the rural areas, outside the coverage of traditional banking services. Less than 13% of the population, most of whom are primarily located in urban centers, have bank accounts. On the other hand 40 million or 30% of the population have mobile phones, and the penetration of mobile technology is increasing day by day. The advent of mobile technology can enable banks to have a presence in rural areas instead of a traditional branch-based environment. Thus, M-Payment/M-commerce will play a significant role for both the un-banked and banked population. This particular payment service will eventually facilitate a comprehensive payment distribution channel for the quick delivery of international and domestic transfer of fund in the rural area. The service can also provide a new channel to facilitate new account acquisition for banks, utility bill payments, point-of-sale purchases, and funds transfers Person to Person, Person to Business, Person to Govt. &vice versa. Although some form of mobile payment through the use of utility bill payment and rail ticket purchasing has started, no standard on this has been established as yet. Strategic priority in this area would involve giving policy guideline in areas such as mobile banking and payment through mobile phone.

ACCESS TO FINANCE:

Access to finance in the agricultural sector (employs 48% of our employed) has been limited until recently. Increased use of technology in KYC, enhancing credit rating for individuals, providing technical assistance for borrowers can significantly increase economic activity. Technology can help greatly in reducing risks for the banks by measuring these risks and also by helping to take more accurate decisions in loan disbursements by giving it a forecasting methodology that uses standard matrix. Information dissemination on these loans and how to prepare oneself to apply for these loans is an area where ICT can help greatly. Using both old and new media tools, enhancing capacity of the entrepreneurs can be a key strategic objective.
Micro financing: Micro-finance institutions are not very different from banking institutions in terms of their intermediary role, although they may be serving different groups in the society.

They are effectively working as de-facto banks for the rural population. Micro-financing helps the particularly marginalized group with fund mobilization and lending. Micro-financing also has a less developed organizational and physical structure compared to a bank.

ICT has a role to play in reducing operational cost – very high operational fee is charged to a borrower so that a micro-financing institution breaks even. A 5% margin is added on top of the interest rate, resulting in a high interest rate which is generally criticized. Some MFIs have proven successful in operational cost reduction with proper use of MIS. And increasing efficiency –Their systems have many efficient modules and updated data which are sent to the HQ (may or may not be through network connectivity). Also, micro-financing institutions need an interoperable system that has the following features:

- Customer's profile and basic financial history
- Extensive financial history of a customer (for tracking credit history and assessment of his financial standing) – this can be an important database for the government
- Micro-financing Institute's branch information (for all institutes and in relation to a customer)
- Introducing healthy competition for sound financial/credit market development in rural areas there are 16,343 micro-financing institutes, 95% in rural areas, meaning more than one institute in each village
- Avoiding negative consequences resulting from overlapping loans given to borrowers through multiple micro-financing institutes

On the regulatory side, Microcredit Regulatory Authority (MRA) is gradually strengthening itself as a more sophisticated organisation. Increasing use of MIS at MRA will help monitor the functionalities of the MFIs operating.

KEY STRENGTHS AND OPPORTUNITIES	KEY CHALLENGES AND RISKS
Most enabled ICT Sector	Public banks are lagging behind in ICT adaptation
Pro-poor policy of Bangladesh Bank	Lacks financial products targeting the poor and outreach
Significant IT enabled changes in the coming years thanks to ICT friendly management of Bangladesh Bank	Very limited rural out reach , only 13% has access to banking in the country
Significant growth in banking in the urban areas	High transaction cost and lax monitoring in the MFI sector

Very strong microfinance network	
Banks are eager to serve more people with limited resources using ICT	Majority of the population in rural areas is using state-owned banks and can't take the benefit of ICT
Nationwide mobile outreach and availability of technology to enable transfer and remittance	Lack of access for rural people in translating into lack of service
Nationwide telecentres and UISC-s which can work as agent for banks coupled with PPP opportunities	Technology adaptability on the demand side and data security on the supply side is yet to be tested
Significant donor interest coupled with national ID card availability for KYC	Lack of access to banking is causing citizens go to informal channels which causes security issues and missed opp.
Lower transaction cost using mobile technology and increase efficiency in giving finances	Over dependence on lending, exploitation and inefficient use of loans

STRATEGIC PRIORITIES:

With a vision of an efficient payment infrastructure, the legal barriers are gradually reducing. However, the real logistical work remains.There is a need for overhauling banking laws and regulations to promote technology based banking with protection of consumers' security and privacy Key strategic focus must remain in the following areas to achieve the vision set on the banking sector. Banking sector is an enabling sector that will drive growth in business and generate other economic activities.

The new infrastructure of BACH requires 100 percent commercial bank participation. Both private and public sector banks need to be at par in incorporating these changes. The other priority on this is to complete work on an electronic payments gateway that will be able to connect to the various systems as they are implemented. The initial role of the gateway will be to provide secure electronic access to connect all Bangladesh banks, financial institutions, agents of banks and payments systems providers to connect to the central bank systems.

After the BEFTN system is completed, utility companies and banks will work together to offer recurring debit transactions for the payment of utility bills for those customers with bank accounts. Also, m-Money services will assist the people in moving remittances throughout the country. Bangladesh Bank will take steps to move forward with the approval of this system. The

Bangladesh Bank will also begin the process of developing regulations that ensure that a domestic ATM switching capability is developed so that consumers can go to any ATM and expect standard services.

ASSURING UNASSAILABLE SECURITY

Having a focus on data security and creating information security, policy for financial data and a regular ICT auditing would be essential. Separately on the Bangladesh bank front, the process of building a highly resilient primary and backup data centre that can house the computing and network environment necessary to operate critical electronic payments systems is essential. In essence, security, privacy and authentication shall be an essential part of the risk management program for all entities involved in payment systems. Using available advanced electronic surveillance techniques to identify and track informal and illegal transaction would be necessary.

DOMESTIC REMITTANCE AND PAYMENTS THROUGH VARIOUS E-PAYMENT SERVICES

Banks and others capable of providing payment services have proven that serving larger lower income retail segments by employing e-systems is profitable. Accomplishing such expansion in payment services will contribute to personal income growth and economic growth of the country. Transaction and payment through mobile phone is a key area which has maximum outreach and easiest access. Bangladesh Bank will encourage development of least cost common payment infrastructure and a fully competitive formal market by minimizing barriers of entry under an umbrella of prudential regulation. This will minimize the informal channels of money transfers. Steps will be ensured to maximize all forms of G2B and G2C payments done through electronic means. Various social security related allowances, salaries etc done electronically can bring greater efficiency, and transparency in the administration and reduced hassle for the average citizens.

INITIATIVES FOR ONLINE CROSS BORDER PAYMENTS

Minimizing barriers to capital flows and reducing the transit cost of remittances will facilitate expansion in international trade and encourage inward investment. In this regard, facilitating online payments, bringing in services such as that of paypal etc that would benefit the e-commerce industry would be tremendously beneficial.

To increase access to banking services by keeping transaction costs to a minimum, options of opening low margin, low volume accounts using tiered KYC through various information and service centres will be explored. National ID card is an important element to provide this service. Such decentralization will not only help reduce the existing overloaded public branches but it will also make banking and financial services much more accessible to rural population.

BANK LED MOBILE TECHNOLOGY FOR BANKING AND PAYMENT

Banks are interested in mobile phone technologies for two reasons.

1. To provide additional channel for delivery to mobile customers for convenience, comfort, control, visibility and security anywhere, anytime.
2. To acquire new customers at lower acquisition costs, mainly because there are more mobile phone subscribers in the world than bank account holders.

Regulatory barriers willt be lifted on this with clear guidelines on such transaction so that new innovations and investments make way.

INCREASED ICT USAGE IN REPAYMENT AMONG MFIS TO BRING DOWN TRANSACTION COST

Strategic focus will be given to incentivise using ICT usage in MFI so that transaction cost on microfinance lending comes down. Stricter imposition of ICT enforced auditing and monitoring can make the sector more transparent and produce credit profiles for small borrowers with the use of national ID card.

CIB

It is crucial to upgrade the capacity of CIB to the policy priority accorded to financial inclusion, expand SME and agricultural lending, and increase overall growth of trade and business. Online CIB will minimise the extent of default loan by facilitating the banks and financial institutions with credit reports. As most people are out of the banking network, some new form of KYC in these regard will be designed along with identifying a digital unique number associated with each name. The CIB concept will be made workable for microfinance users as well.

INTEROPERABILITY

As more and more new form of technology is incorporated into different banks, the need for standardization in core banking platform is going to be needed. The inter-operability will make sure that all interbank transfers are seamless. Interoperability needs also be maintained between any forms of distribution outlets. Banks' leadership in this regard is essential. Bangladesh Bank will work with other banks to develop ways to use the Mobile Money system. An example of a new feature for the M-Money system would be an electronic connection through a bank to BEFTN. This connection will permit transfers from the M-Money system to the bank accounts of consumers, merchants and utilities. MRA, the regulatory body for Microfinance, will look at imposing some sort of technical standard that every MFI should adapt to. Core banking software will be gradually installed in all the banks.

PARTNERSHIP STRATEGY

Bangladesh Bank will work closely with Bank of International Settlement (BIS) for developing security and privacy framework. The experiences in automation and e-payment infrastructure

building in other countries will be important for both private sector and regulatory authorities. International development partners will play an important role in implementing the priority agenda. Bangladesh Bank will work with the national identity database creating entity for improving KYC of rural customers for improving access to finance by marginalized population. Mobile value added service providers and telecom operators will be important partners in rolling out mobile banking services. NGOs will invited to popularise banking services among the rural citizens as extended agents of banking institutions.

KEY INDICATORS FOR MEASURING PROGRESS

- Share of G2C payments that are happening electronically
- Share of population having access to some form access to banking
- Share of transactions that are happening using electronic and mobile technology

3.V. INDOMITABLE YOUTH

KEY PROBLEMS	• Lack of participation by youth in decisions and policies that affect the lives of adolescents and youth. • Risky behaviors among the youth: early pregnancies, substance abuse, sexually transmitted infections including HIV/AIDS, violence, criminal and gang activities, and premature death. • Poor job market opportunities magnified by specific barriers posed by employers to hiring first job seekers. • Lower fertility rate in the country means that today's youths will enter the workforce with fewer nonworking dependents. Lengthy duration of unemployment could be counterproductive for social equity and economic momentum. • The absence of an organized network to distribute centralized information on various development sectors to local levels which can be spearheaded by youth results in lost opportunities in achieving the MDG goals as well as bringing about sustained long term development.
VISION	Well educated youth with secular, democratic, ethical, and humane values who will drive Bangladesh to a happy nation without poverty.
OUTCOME	The youth of Bangladesh, including the disadvantaged groups like women, the extreme poor, and person with disabilities etc. accessed necessary information, skills and education to transform their lives individually and as members of groups and play a pivotal role in nation-building.

STRATEGIC PRIORITIES

RIGHTS AND RESPONSIBILTIES

The overall priority for youth is to empower young men and women to contribute more effectively to national development and good governance and to integrate their perspectives into national policy and decision making processes. Ensuring that the youth rights are enhanced through use of ICT, their responsibilities, particularly in the context of development advocacy, acting as reform agent and fair use of ICT will also be stressed.

SKILSS AND STUDIES

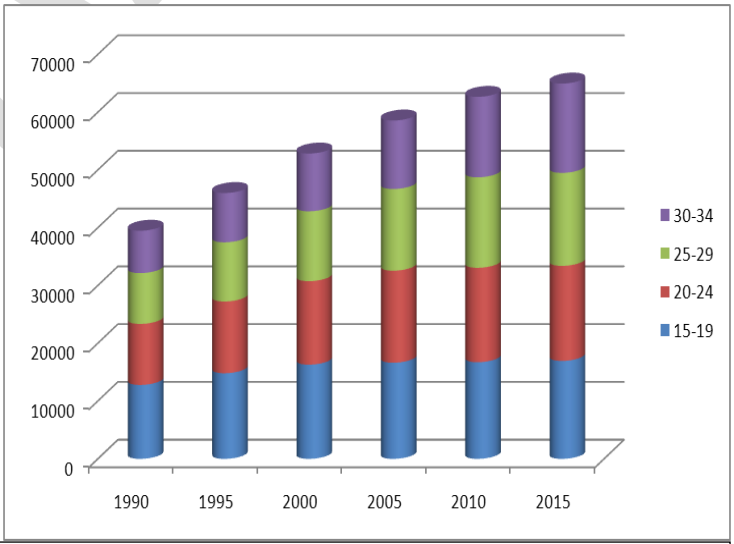
For tertiary education, and partially for primary education, the Internet's capacity for two-way interaction offers the greatest promise for improving access and affordability and for providing flexibility to combine work with further study. Specialized education in ICTs may be encouraged to feed the burgeoning IT industry, the alignment of the overall educational curriculum to embrace the new ICTs in a broad but pervasive way and focusing on education in global languages, especially English, is key to expanding access to global content and employment market.

EMPLOYMENT AND ENTREPRENEURSHIP

Promotion of Research and Development in the ICT sector and promotion of ICT Parks and Incubators to provide job opportunities for the youth will be accelerated as well as promotion of Business Process Outsourcing to provide better job opportunities for the youth. Encouragement will be given to Financing Agencies to provide access to funds to support young people's ideas and encourage ICT entrepreneurship. Actively pursue and ensure that the Private Sector including the expanding Telecom Market contributes to Research and Development and gets involved in human resource development.

INTRODUCTION

The future growth of Bangladesh will continue to be closely linked to the development and empowerment of its youth. The fact that investing in youth is of the utmost importance to any developing nation is a foregone conclusion. On one hand, it is important because the youth represents approximately 26% of Bangladesh's present population, creating a population bulge which needs immediate and sustained attention, and on the other hand, this large proportion of youth holds the keys to the brighter Bangladesh in the coming days. The youth unemployment rate rose from 2.5% in



BANGLADESH POPULATION BY AGE GROUP (IN THOUSANDS, ACTUAL AND PROJECTED)

Source: UN Population Division Statistics

1989 to about 11% in 2000, and nearly 80% of the total unemployed in the country is the youth population[37]. The trend continues unabated.

The Government of Bangladesh (GoB) has been focusing on education, capacity building, participation, employment and development of the youth. Nevertheless, in terms of numbers, there are evident decreases of enrollments from primary to higher education. Statistically roughly 4 million enrolled at the secondary level comes down to 0.5 million at the college level and above. .[38] Apart from the confusion arising out of different methods and curriculums, quality of education has fallen over the last two decades, which has adversely affected the youth of this country. Total budget allocation for education development programmes in the Ministry of Education as a percentage of national allocation have declined from 5.73% (2010-11) to 4.22% (2008-9).[39]

Globally the World Programme of Action for Youth[40] (WPAY), which was adopted by UN General Assembly in 1995[41] outline the broader agenda for youth development. At least 10 public policies of Bangladesh including the "National Youth Policy 2004"specifically refer to many of the WPAY agenda either explicitly or implicitly.

Tackling the needs of youth (15–34) is a very challenging task for the planners, the development partners of the country, and most importantly, for the society itself. Today's youth represent the largest cohort ever to enter the transition into the greater social milieu. They face enormous life-altering issues like —unemployment, lack of schooling and skills, violence and drug abuse, among others— which take a massive toll on society economically and socially. Yet, it is often forgotten that they have little or no voice in current strategies for development, leaving them susceptible to a politically and economically undesirable environment.While youth development has emerged as a new focus across the world —this segment of the population remains a largely neglected constituency.

Young people are the most early and eager adopters of new technologies. The first few years of the new millennium saw extremely rapid increases in Internet, mobile phone, and computer use in developing countries. Between 2000 and 2003, the developing world gained more than one-quarter of a billion Internet users and almost half a billion mobile phones. These

[37] Statistical yearbook of Bangladesh, 2008, Bangladesh Bureau of Statistics

[38] http://www.moedu.gov.bd/edu_statistics.php

[39] http://www.moedu.gov.bd/index.php?option=com_content&task=view&id=264&Itemid=278

[40] WPAY outlines 15 priorities for the youth which can be summarized under the following three clusters:

[41] Guide to the implementation of the World Programme of Action for Youth, UNDESA, United Nations, 2006

proportions, similar to those for 2002 and 2003, suggest that approximately 130–160 million of the 269 million new Internet users between 2000 and 2003 were ages 15 to 24.

VISION

Youth are critical stakeholders in the development processes of Bangladesh. They have diverse needs and development priorities. Earlier experience from various consultations by government agencies and civil societies has shown that the development priorities of the youth in each geopolitical zone across the country do not differ remarkably. The youth are primarily concerned about employment, investments in agricultural development, youth entrepreneurship, ICT education and a market demand driven educational system, opportunities to participate in the development of their country and investments in health strategies and programmes targeting key challenges like HIV/AIDS, malaria and youth friendly reproductive health services.

There is a bright window of opportunity to harness to better use the 'old' ICTs including broadcast technologies to improve the lives of young people. The new ICTs add more power to the potential and coupled with the old ones, create a formidable range of tools. A reform framework which seizes these opportunities can transform the next generation into an active beneficiary group, which in turn can significantly change the development landscape of Bangladesh.

OUTCOME STATEMENT

The youth of Bangladesh, including the disadvantaged groups like women, the extreme poor, and handicapped, etc. have the necessary information, skills and education to transform their lives individually and as members of groups and play a pivotal role in nation-building by contributing towards the development of institutions through appropriate use of ICT tools.

SITUATION ANALYSIS

The United Nations (UN) defines 'youth', as those persons between the ages of 15 and 24 years, without prejudice to other definitions by Member States.[42] 18% of the world's populations are youth. According to UN statistics 85% of them live in developing countries while 60% in Asia and majority of them in rural areas. UN adopted a number of declarations and programmes of action which make specific references to youth and their rights. There are certain priority areas for action[43] e.g. ICT, education, employment, participation in decision making, etc.

GoB had been focusing on the youth sector from an early stage. It has initiated an action plan on youth employment in 1978 followed by the creation of a separate Ministry of Youth and

[42] A/36/215 and resolution 36/28, 1981 of the General Assembly

[43] The World Programme of Action for Youth, WPAY (to the Year 2000 and beyond)

Sports and a dedicated Youth Department of Youth Development in 1981. The draft Youth Policy was announced in 1983 while the final National Youth Policy was approved in 2003. According to the policy, persons between 18 and 35 years are called 'youth' in Bangladesh. Major objectives of the national policy are to create a sense of respect and rights awareness and empower them by creating appropriate opportunities so that they could play an active role in the development initiatives. It further aims to motivate and encourage them to be engaged in voluntary social services and pointed out their rights and responsibilities.

The Department of Youth Development (DYD) is charged with the responsibility for 'transforming the disorganized and unproductive youth into an organized, disciplined and productive workforce'.[44] The vision of the DYD is to facilitate youth employment or self-employment through training and microfinance and to involve the youth in mainstream national development processes.

The National Youth Policy 2003 has attempted to implement a number of measures, including:

- Establishing an institutional framework to facilitate youth development programmes nationwide. This includes 475 Upazila offices; 510 youth training centres, offering skills development and vocational training, microcredit, input supplies; and 8500 youth clubs that are mobilizing young people for local action.
- DYD also established a National Youth Centre for training, youth exchange programmes and research relating to youth development, as well as a Central Human Resource Development Centre (in 1992) at Savar near Dhaka for enhancing the professional skills and efficiency of officers and staff of DYD.
- Motivational and awareness programme on HIV/AIDS, STDs, anti-drug campaign and behavioral development of young people.

While the DYD has developed a wide network of youth centers and affiliated youth clubs, its outreach is still quite limited and its ICT efforts are rather peripheral. The department is not adequately resourced – its total allocation is less than half a percent of the overall national budget. The DYD is also yet to adopt a participatory approach to its policy and decision making processes, hence is seen by young people as a remote entity.

Other policies and strategies that bear specific reference to youth include: Bangladesh Population Policy (first adopted in 1976 and now under revision); National Children's Policy (1994); Bangladesh National Food and Nutrition Policy (1997); National Health Policy (2000); National HIV/AIDS and STD Policy (1996 final draft); National Reproductive Health Strategy (1997) and Bangladesh National Strategy for Maternal Health (2001). A National Skills Development Policy is being developed by Ministry of Labour and Employment which is expected to have ICT as one of the 4 key areas of concentration.

[44] National Youth Day 2006 publication by Department of Youth, Ministry of Youth and Sports, Dhaka.

Currently, there are as many as 776 training centers run by the Department of Youth. There is also a good number of Technical Training Centers (T.T.C) of the BMET (Bureau of Manpower, Employment and Training) under the Ministry of Labour and Employment to offer training for various skill developments. Many other Ministries and NGOs are also involved in youth development in the country.

Apart from Government direct interventions through the relevant ministry, Government has successfully created a policy and institutional environment through creation of institutions and supply of resources for rapid employment in private sector. Bangladesh has now the biggest microcredit sector in the world with a coverage of 14 million clients, around 70% of whom are youth. Creation and supporting PKSF, a national apex fund for promoting NGO-MFIs played a crucial role in this regard. Total outstanding loan, mostly employed in non-crop sector, is about USD 1 billion at the moment.

Key Strength and Opportunities	Key Challenges and Risks
• Young people are more likely to adopt new technologies for economic, physiological, and social reasons. Longer working lives mean that young people have more time to gather the benefits from investing in new technology. • Leveraging or developing a network to distribute centralized information on various development sectors to local levels which can be spearheaded by youth. • As lower fertility rate in the country means that today's youths will enter the workforce with fewer nonworking dependents, and thus fewer to support, if their duration of unemployment is lengthened they could be counterproductive for social equity and economic momentum. • ICTs provide information about non-ICT job openings to youth. Online job databases can offer information to those with Internet access. Mobile phones can also play a life-altering role for job information. • ICT can broaden opportunities and provide second chances for work. IT enabled services targeted towards domestic and	• Lack of participation by youth in decisions and policies that affect the lives of adolescents and youth. • Risky behaviors among the youth: early pregnancies, substance abuse, sexually transmitted infections including HIV/AIDS, violence, criminal and gang activities, and premature death. • Poor job market opportunities magnified by specific barriers posed by employers to hiring first job seekers.

export markets have the potential to create new job markets for the youth. • ICT-enabled opportunities for anytime, anywhere education including formal and vocational education can alter the education delivery paradigm by improving quality and making it more market-responsive.	

STRATEGIC PRIORITIES

Any ICT Strategy for youth should consider the main ways of how ICT use matters to youth.

These are:

- entertainment,
- convenience,
- connections,
- skills acquisition
- employment
- information.

These themes illuminate how ICT matters toyoung people in multi-faceted ways while they navigate their emergent identity as a citizen and part of the broader society.

Making public sector information available to the youth population in a format that is easily and inexpensively replicable and distributable, an effort which temperamentally suits youth the most, can play a very important role for almost all sectors of development in the country. Leveraging or developing a network to distribute centralized information on various development sectors to local levels which can be spearheaded by youth can go a long way in achieving the MDG goals as well as bringing about sustained long term development.

Youth groups present a viable option to establish the sustainable network who can exploit the above opportunities. We should ensure that the network goes beyond mere dissemination responsibilities and becomes agents for mobilization of local information and service providers and raising awareness for the public. Local entrepreneurs offering ICT-enabled services such as mobile telephony, photocopying, faxing, and sometimes even internet browsing and chatting can be persuaded to 'sell' ICT-based content for their own commercial interest.

As lower fertility rate in the country means that today's youths will enter the workforce with fewer nonworking dependents, and thus fewer to support, if their duration of unemployment is lengthened they could be counterproductive for social equity and economic momentum.

Young people are more likely to adopt these new technologies for economic, physiological, and social reasons. Longer working lives mean that young people have more time to gather the benefits from investing in new technology. The cost of investing in the skills for the youth would be lesser than investing in relatively older generations. Moreover, youth find it easier to acquire complex information-processing tasks. The tendency of youth to use these technologies is amplified by the desire to use these technologies for entertainment as well as gathering skills and educational purposes and is reinforced through peer learning and network effects.

ICT can broaden opportunities and provide second chances for work, for example, in business process outsourcing allowing a large number of youth to be employed overseas without having to leave their country. ICTs provide information about non-ICT job openings to youth. Online job databases can offer information to those with Internet access. Mobile phones can also play a life-altering role for job information. New ICTs can also offer the potential for a second chance at work for youth with disabilities and socially disadvantaged groups such as women.

ICTs diversify the range of learning opportunities, but lack of education can be a barrier to their use. Distance education has incorporated television and radio for more than 60 years, and these traditional ICTs are still the most cost-effective ICT educational interventions for secondary schooling.

The planners and policy makers should develop of ICT Policies that address ICT and Capacity Building of the Youth Policy Issues such as mainstreaming of National ICT Policies into sector plans for implementation, waiving of taxes on ICT Products and providing of incentives to the ICT Industry.

The overall aim of an ICT strategy for youth is to empower young men and women in Bangladesh to contribute more effectively to national development and good governance and to integrate their perspectives into national policy and decision making processes. This is a critical factor in the country's aim to achieve the Millennium Development Goals.

The rights of youth and adolescents, covering almost all aspects of their lives, may be summarized into the following main categories:

- **Survival rights:** the right to life and to have the most basic needs met (e.g., adequate standard of living, shelter, nutrition, medical treatment).
- **Development rights:** the rights enabling children to reach their fullest potential (e.g. education, play and leisure, cultural activities, access to information and freedom of thought, conscience and religion).
- **Participation rights:** rights that allow children and adolescents to take an active role in their communities (e.g., the freedom to express opinions; to have a say in matters affecting their own lives; to join associations).
- **Protection rights:** rights that are essential for safeguarding children and adolescents from all forms of abuse, neglect and exploitation (e.g., special care for refugee children;

protection against involvement in armed conflict, child labour, sexual exploitation, torture and drug abuse).[45]

Issues of how to teach young people to be safe and responsible users of this new technology, protecting them from some of the risks of unfettered access, should also be addressed early on. Research should be initiated as how to ensure the free flow of information and unfettered access to internet without exposing young and adolescent ICT users to abusive use and practices.

Although the youth have the right to make decisions about their own future, they need to make sure these are informed decisions and that they know all the possible consequences of the choices they make. The responsibilities of youth, particularly in the context of ICT adoption and use should be to adhere to these basic principles:

- Individual responsibilities: responsibilities to contribute to self-development, strive to reach the full potential of individual achievements and to avoid abuse of ICT tools for anti-social behavior and self abasement (e.g. following fair-use policies for ICT use).

- Social responsibilities: contributing to the development of society, local community, actively bridge the gap of inter-generational issues and respect freedom of speech and diversity, promote appropriate level of ethical conduct (e.g. advocacy against drug abuse and act as conveyer of new and productive ideas for social change and reform).

- National responsibilities: upholding the culture and tradition of the country and pursue goals which preserve and protect the environment and national identity (e.g. to pursue appropriate netiquette on the web).

It may be borne in mind that for tertiary education, the Internet's capacity for two-way interaction offers the greatest promise for improving access and affordability and for providing flexibility to combine work with further study.Although specialized education in ICTs may be encouraged to feed the burgeoning IT industry, it should be remembered that a lack of education hampers the use of the new ICTs in a broad but pervasive way. Education in global languages, especially English, is thus key to expanding access to global content, together withdevelopment of local language Web sites for universal use.

In spite of the policy imperative to enhance the skills of young men and women, the quality of education and life skills provided through traditional and vocational education systems in the country remain poor.[46] Currently up to half the young population in Bangladesh is illiterate.
Requisite basic skills include the ability to createand manipulate computer files; use applicationssuch as word processors and spreadsheets; typewith a reasonable level of accuracy and speed;and manage a computer by performing tasks suchas installing and uninstalling programs, and fixingminor technical problems.

[45] http://www.hrea.org/index.php?doc_id=146

[46] Youth in Bangladesh: a thematic review – UNFPA, Bangladesh, May 2004)

There are very limited opportunities for young people to practice or apply what they have learned in schools. The prevalent education curriculum and mode of delivery is not adequately aligned with market demands, nor does it provide opportunities for interaction with the private sector, government and community.

As ICT penetration increases, it is likely thatthese basic competencies will become even moreimportant. Ensuring that the current generationof school age children and young adults hasaccess to computers and computer educationwill be essential in minimizing digital and othergaps between developed and less developed economies. It is worth noting that the basic skills listedabove, while requiring computer access, donot necessarily require powerful or expensivecomputers – nor do they require high speedInternet access. This indicates that significantadvances can be made without the high level ofequipment and infrastructure often available indeveloped economies.

Of course, many other advances, such as thetransformation of business and governmentprocesses, are reliant on a higher level of ICTinfrastructure, including broadband access.

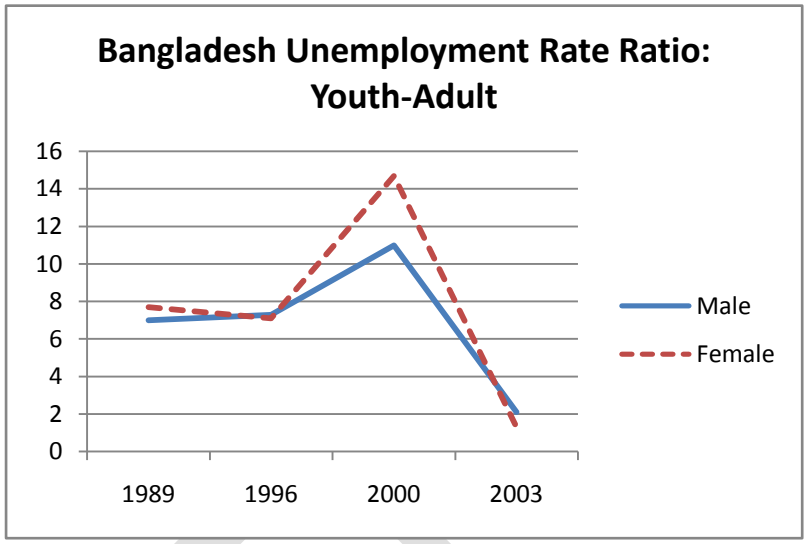
The Youth Employment Network (YEN) initiative, developed by the UN in collaboration with the World Bank and ILO, urges governments to incorporate youth employment goals into comprehensive employment policies and to stimulate broad based employment-intensive growth as

The best means of creating employment for young people. Four areas have been highlighted for national action:

- Employability: the need for governments to invest in education and vocational training foryoung people, and improve the impact of those investments;
- Equal opportunities: the need for governments and enterprises to give young women the sameopportunities as young men;
- Entrepreneurship: the need for governments to make it easier to start and run enterprises toprovide more and better jobs for young women and men; and
- Employment creation: the need for governments to place employment creation at the centre ofmacroeconomic policy.[47]

[47] http://www.ilo.org/public/english/employment/strat/yen

In 2009, 81 million young people were unemployed, the most ever.Youth unemployment rate rose from 11.9 percent to 13.0 percent between 2007 and 2009, an increase of 7.8 million.In 2008, an estimated 152 million young workers –or nearly 25 percent of the world's working poor– were living with their families on less than US$1.25 per person per day.Young women have more difficulty than young men in finding work. The female youth unemployment rate in 2009 stood at 13.2 per cent compared to the male rate of 12.9 per cent.[48]



Source: UN Statistics

The unemployment rate of youth in Bangladesh is at an all-time high of 41.6%, highest among the age group of 20-24 years.[49] Job opportunities for youth in rural areas are scant and access to education and skills training is limited. There is widespread youth underemployment, which has serious individual and community costs, and is considered an 'economic waste'.

The following approach may be undertaken to tackle unemployment and foster entrepreneurship among the youth:

- Promotion of Research and Development in the ICT sector and promotionof ICT Parks and Incubators to provide job opportunities for the youth.
- Promotion of Business Process Outsourcing to provide better job opportunities for the youth.
- Encourage Financing Agencies to provide access to funds to support young people's ideas and encourage ICT entrepreneurship.
- Encourage and ensure that the Private Sector including the expanding Telecom Market contributes to Research and Development and gets involved in human resource development.
- Harnessing the use of Web 2.0 Opportunities; blogs, social networks etc. Exploiting additional activities that can be performed using mobile phones.
- Awareness and High Level Commitment to take ICT for youth as a priority and funds should be allocatedto move from pilots and scale up implementation.

[48] *Facts on Youth Unemployment*, ILO, 2009

[49] BBS report on the labour force survey 2002-2003, December 2004

- Provide various incentives (tax exemption, special ICT investment funds, micro-credit, subsidies, tax reduction on equipment and software, etc.) to youth to create small-scale enterprisesand build youth capacities, especially in entrepreneurship.

PARTNERSHIP STRATEGY

National Federations of Youth in Bangladesh[50]has drawn attention to issues like lack of education, unemployment, drug-addiction, unlawful acts etc. which can only be comprehensively addressed by consolidated efforts of all relevant groups. No coordinated effort has been made so far to incorporate the new technologies into youth related development processes so far. Partnership strategies should support and align the utilization of renewable energies with the existing policies to serve as power for ICT infrastructure for rural areas. At present youth issues are dealt with various organs of the government and CSOs and NGOs (see box). A comprehensive strategy to mainstream youth issues in sectoral development across the government institutions and non-government institutions should be actively pursued.

Some areas of youth development would lend more scope to meaningful partnerships: ICT Capacity Building of the youth should be extended to the grass root level to attain a Critical Mass of youths trained in ICTs.Best Practice Projects on ICT and Capacity Building of the youth that have been implemented elsewhere should be replicated across the country in close cooperation with all stakeholders. Promotion of research and development by the youth on appropriate technologies must be encouraged and setting up of possible funds to encourageinnovation and entrepreneurship should also be actively explored.

Agencies Involved in Youth related Development

Government Agencies

- Department of Youth Development, Ministry of Youth and Sports
- Department of Women Affairs, Ministry of Women and Children Affairs
- Bureau of Training, Labour and Manpower, Ministry of Labour and Manpower
- Pally Karma Sahayak Foundation (PKSF)
- Bangladesh Rural Development Board (BRDB), Ministry of Local Government
- Bangladesh Academy for Rural Development, Ministry of Local Government
- Bangladesh Small and Cottage Industries Corporation, Ministry of Industry
- Karma Sangsthan Bank

Some Major Non-Government Agencies

- Bangladesh Rural Advancement Committee (BRAC)
- Association of Social Advancement (ASA)
- Grameen Bank

INDICATORS MEASURING PROGRESS

- Access to, and use of ICT, by youth
- Number of primary and secondary educational institutions having access to ICT tools
- Number of young people having recognized computer use certifications (e.g. ICDL)
- Number of young people being employed in service delivery through ICT
- Number of ICT related (software/hardware/IT Enables Services) start-ups

[50] A national coordinating council of organizations working with youth

3.VI. SERVICE DELIVERY-FOCUSED PUBLIC PRIVATE PARTNERSHIP

KEY PROBLEMS	• The concept of PPP is new for the e-service delivery in Bangladesh. There is a gap in perception about PPP within the government and private sector. • The relevant stakeholders are not aware about strong political commitment of the government and huge opportunity for the private sector and new policy and guideline for PPP is not well circulated and explained among the stakeholders. • The transformation of strategic priories from agenda into action requires significant resource mobilization, which is currently not available. Only a concerted effort from the government, private sector and development partner can make it possible. • The inefficient one-stop service and inadequate capacity of the BOI flags concerns about effectiveness of the new initiative to attract both foreign and domestic investment through PPP route. • The incentives for the private sector generally remain in paper and there is lack of trust between relevant stakeholders in this regard.
VISION	To make e-service delivery a reality through active participation of private sector under PPP.
OUTCOME	All strategic priorities are converted into e-service delivery and ICT projects and implemented under PPP framework.

STRATEGIC PRIORITIES

- The line Ministries will work with the Office of the PPP to identify and formulate PPP projects and invite private sector to come forward for their implementation. The Office of the PPP will coordinate among various government and private agencies for accelerating approval and implementation of PPP projects. At least five projects will be identified and developed under each ministry to be initiated in each fiscal year. In identification of projects strategic priorities in vertical and horizontal segments of the "Strategic Priorities" document will be consulted.
- The Office of PPP will develop a comprehensive five year plan under which PPP projects will be identified and contribution of the government to those projects will be estimated. These estimates will be included in the national budget in each fiscal year.
- The Office of the PPP will undertake programmes for building capacity of government officials and private sector participants in collaboration with development partners so that project identification and approval process strictly follow stipulated time frame and handled with professionalism.
- The office of the PPP will design programme to raise awareness about potential of win-win-win benefits for private sector, government and citizens of the country. Promotional materials, road show at home and aboard, workshop and other appropriate programmes will be undertaken so that private sector feels confident and pro-actively participate in PPP initiative.
- The Office of the PPP and the line Ministries and implementing agencies will encourage private sector to come forward with unsolicited proposals where private sector innovation and dynamism will be leveraged for offering e-services to citizens.
- The office of the PPP will develop specific guidelines for offering tailor made incentives for PPP projects by sub-sector and by priority, which will be followed by the ministries for offering special incentives for a particular project.
- The office of the PPP will work with similar government agencies abroad to share views and exchange experiences to understand the best practices and to make the PPP initiatives in Bangladesh vibrant and effective.
- The Office of the PPP and the line Ministry will work with the development partners to engage them in PPP projects for participating either in government contribution or investment by the private sector.
- The Office of the PPP will follow state-of-the-art online process for proposal submission, processing, decision making and implementation progress tracking with individual interface for each Ministry and implementing agency.

INTRODUCTION

Public private partnership (PPP) is a powerful instrument that has emerged in many countries initially to improve infrastructure. The PPP was also used extensively for promoting e-

government in many countries, to ensure competitiveness, sustainability, and effective management of various projects. In the context of Bangladesh, PPP is needed not only for e-government projects, but also for the projects for ensuring access to information, services and participation of citizens in democratic process. The history of PPP in Bangladesh began in 1996 by adopting a private sector power generation policy. In 2004, Bangladesh Private Sector Infrastructure Guidelines (PSIG) were issued by the government under Public Private Partnership Initiative in order to boost individual investment in the development and maintenance of infrastructure. This guideline was meant mainly for infrastructure project, where private sector was provided access to assured revenue generating opportunities through building various infrastructures through investment. A number of telecommunications infrastructure projects were also undertaken under the current PPP guidelines. The guidelines considered only large infrastructure projects, where mitigating investment gap was the prime motive. The guidelines were very cumbersome and not suitable for projects in the service sector. Initiation and approval process of PPP projects were unclear. Procurement processes for PPP projects were less well known and understood compared to similar projects included in the Annual Development Programme (ADP). A major cause for the lack of private sector participation in PPP projects was the absence of consistent procedures to identify, formulate, appraise and approve PPP Projects [GOB, 2010].

The government for the first time in the country, through its national budget FY 2009-10 introduced the concept of PPP budget. In addition, the Government issued a position paper on PPP, titled “Invigorating Investment Initiative through Public-Private Partnership” [MOF, 2009]. Considering the need for quick decision making for PPP projects, need for simplifying the investment approval procedure and also greater need for inclusion of projects in the service sector, particularly, projects related to materializing vision for Digital Bangladesh, the government took initiative to recast a new “Policy and Strategy for Public-Private Partnership 2010”. Through rigorous consultations with relevant stakeholders, the “Policy and Strategy Paper” was approved by the government and published in Gazette on August 02, 2010.

The government has taken a two-pronged strategy for building public-private partnership: one is to attract investment for projects, where building new infrastructure and expanding existing infrastructure is the major component; the second is to attract innovation and sustainability of public service delivery to the citizens. While the government is committed to launch public-private partnership in a big scale, the essential ingredient to that endeavour is to set up a forwardlooking strategy and a framework for operationalisation of public-private partnership as well as clear-cut procedural guidelines for the sake of ensuring transparency and building confidence among the private sector players [GOB, 2010]. The approved document is a step towards that end.

According to the country assessment matrix on potential of PPPs in e-government projects, Bangladesh is one of the developing countries, where potential for PPPs in e-government is high [World Bank, 2007]. However, the country assessment score on potential for e-government is comparatively lower than countries like Vietnam, Pakistan, Cambodia and Philippines.

While primary motivation for PPP is attracting investment for infrastructure projects, it is clear that, given the size and nature of ICT industry in the country, the driving factors towards PPP in ICT sector are 'innovation', 'flexibility and quick project implementation skills', and 'ensuring outreach of government services to common citizens'. Many important deployment of services, identified in different chapters here, by the government does not require large investment compared to projects like bridge or electricity station. On the other hand, revenue generation scope is not also high or consistent (vary location to location) for many priority-ICT projects. For example, information and ICT-based services through telecentres (community e-centres) are revenue generating, but break-even depends on level of poverty in the area and skills and motivation of the infomediaries.

VISION

To make e-service delivery a reality through active participation of private sector under PPP

OUTCOME STATEMENT

All relevant strategic priorities are converted into e-service delivery and ICT projects and implemented under PPP framework.

CONCEPT OF PPP AND UNDERSTANDING NEW POLICY AND STRATEGY

Public private partnership is a win-win relationship between the government and various private sector players for the purpose of delivering a project or service by sharing risks and rewards of the venture [World Bank, 2007]. In a PPP project, the private sector is the active party who undertakes activities, depending on the model, from the stage of design, up to the stage of operation and maintenance generally for the lifetime of the infrastructure and service. The financial participation, again based on the model, may be zero for the government or for the private sector, or any combination of financial sharing. In most of the cases, PPP allows private sector into areas of business, where the government holds control over infrastructure or service before such partnership.

The new PPP Policy and Strategy Document (PPSD) has set a pro-private sector rules, which are elaborated below to understand the scope for the private sector players in PPP in ICT sector in general.

Focus on Service Sector, particularly on ICT: In the Objectives of the PPP Policy and Strategy Document (PPSD) it is clearly mentioned that it spell out principles of partnership with private sector for undertaking various projects related to infrastructure as well as public service delivery (Objective 2.a.). The policy allows to choose variety of models for implementation of PPP projects (a list of possible models is presented in Annex A).

In the sectoral coverage section (section 5) of the PPSD the coverage of sectors under PPP has been kept quite open, mentioning, "Any project fulfilling one or more of above-mentioned applicability criteria in any economic sector, according to the International Standard Industrial Classification (ISIC) of all Economic Activities, Revision 4, specified by the United Nations, is eligible for PPP". The list of priority sectors clearly identifies sectors, where integration of ICTs can facilitate transformation of the sectors towards pulic benefit and public sector efficiency. The specific priority sectors are:

- 5.k: Telecommunication systems, networks and services including information and communication technology (ICT) (ISIC 60-63)
- 5. n: IT park (ISIC 81-82)
- 5.o: social infrastructure e.g. health, education, human resource development, research and development, and cultural facilities, (ISIC 85-88)
- 5.p: e-service delivery to citizens (ISIC 85)
- 5. q.iii: Rural Internet projects (ISIC 61).

Applicability and Eligibility for PPP: The applicability (section 4) and eligibility criteria are also flexible enough to accommodate a wide range of initiatives and entities. Any project that generates public goods and services will be considered under the public-private partnership, if at least one of the following circumstances exist for a project :

i. The implementation of the project is difficult with the financial resources or expertise of the government alone;
ii. Private investment would increase the quality or level of service or reduce the time to implement compared to what the government could accomplish on its own;
iii. There is an opportunity for competition, where possible, among prospective private investors, which may reduce the cost of providing a public service;
iv. Private investment in public service provides an opportunity for innovation; and
v. There are no regulatory or legislative restrictions in taking private investment in the delivery of public service.

Item (ii) – (iv) are specifically applicable for e-service delivery, where the government is opening its door for private sector participation.

On the other hand, the eligibility criteria (section 6) cover both for-profit and not-for-profit entities to come forward with PPP proposals. It also invites foreign for-profit and not-for-profit entities to initiative PPP projects, with a caveat that when a PPP proposal is approved the foreign entity will need to be registered in Bangladesh. The rationale behind such option is that in Bangladesh non-government sector has been playing an important role to assist the government in delivering key services like health care and education with extensive outreach network access the country. Such inclusion may generate interest among the national and international NGOs to leverage on the PPP provisions to increase investment and ensure "public goods" principle for the marginalized communities. The inclusion of NGOs also opens opportunity to foster partnership between for-profit and not-for-profit entities (local and / or

national) to ensure sustainability of service delivery, where income generation potential is relatively low.

Simplified Process of Approval: The previous guidelines were very cumbersome and time consuming, and there was no clear delegation of roles of ministries and Board of Investment. The PPSD has has been designed in such a manner that the process of initiation and approval is simple enough to complete the process maximum within one year. Some salient features of process simplification are presented below:

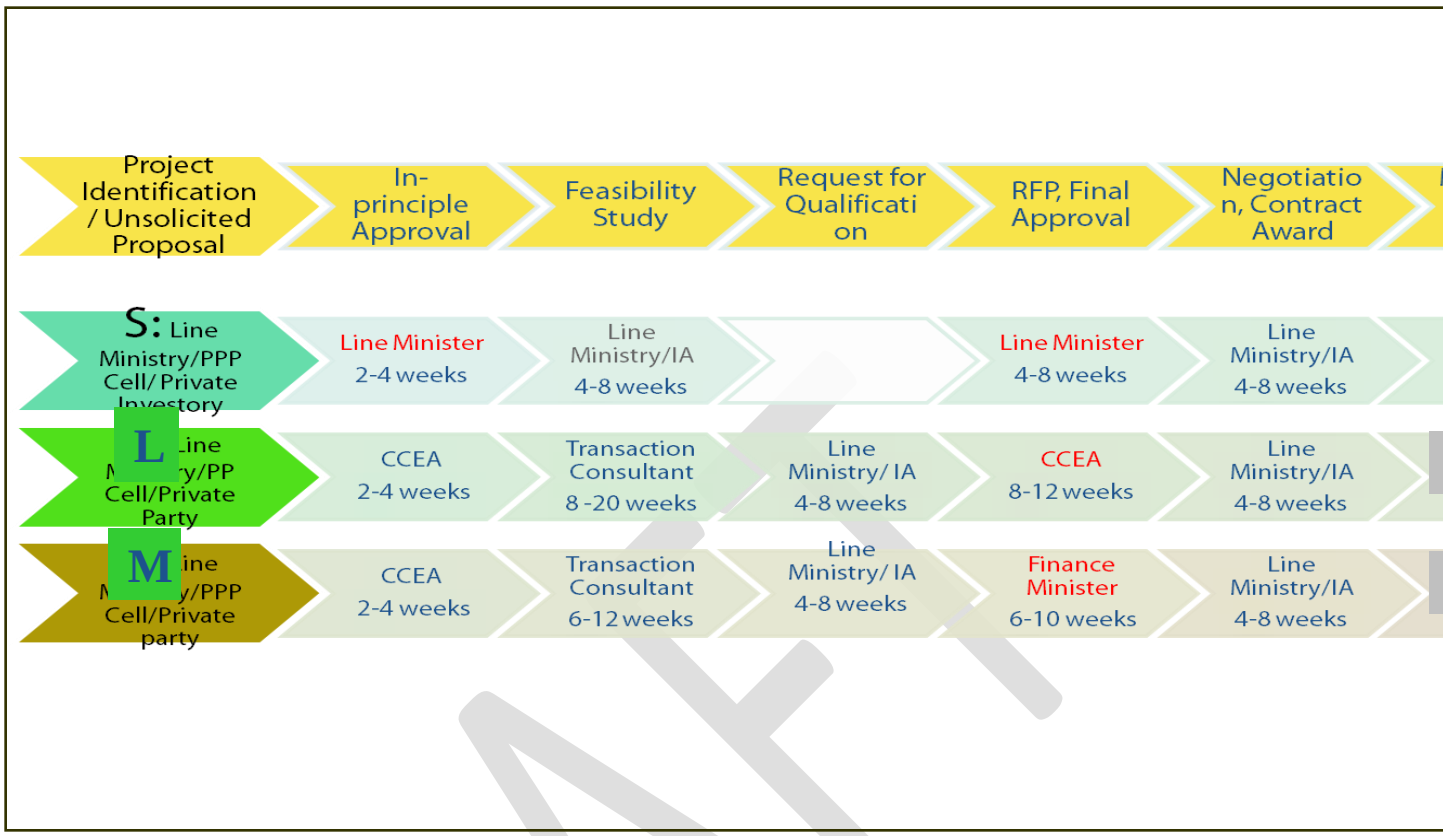
a. An Office of the PPP has been set up at the Prime Minister's Office to ensure quick approval of the PPP projects. The CEO of the PPP office can be from the private sector and directly accountable to the Prime Minister. As a result, a short-cut route has been created for faster processing of the projects [see Box 1 for detailed institutional infrastructure].
b. Line ministries have been empowered by making the Ministers to be the decision making authority for small and medium size projects. For small projects with the ceiling of BDT 500 million excluding on-going capital for expansion will be approved by the line Minister, whereas a project with a size between BDT 500 – 2.5 billion will be approved by the Finance Minister himself. The large project of size above BDT 2.5 billion will be approved by the Cabinet Committee on Economic Affairs (CCEA). For check and balance, there is a provision for financial approval from finance division.
c. New policy formulation, policy approval, and modification remains with CCEA, which will allow enough flexibility in terms of addressing any special circumstances. It is to be mentioned that along with the PPSD, three separate guidelines for formulation, appraisal and approval of large, medium and small projects. The guidelines are straight forward and transparent to the potential investors.
d. The project initiation and approval process has been streamlined and for this purpose three separate guidelines for formulation, appraisal and approval for large, medium and small projects have also been approved. The project approval time for large project is maximum one year, where as for medium and small project it is maximum 42 weeks and 28 weeks respectively. Furthermore, there is no request for qualification for small projects [see Figure 1]. The process flow for small, medium and large projects are presented in Annex B.

BOX 1. INSTITUTIONAL STRUCTURE FOR PPP

Institutional Structure ahs been kept simple and Line Ministries/ Impementing Agencies are put on the driving seat so that PPP projects can move quicker. Office of the PPP mainly plays a catalytic role in facilitating ministries/ implementing agencies to accelerate decision making process with due diligence. The structure and roles of various entities for PPP are presented below.

Entity	Chair	ToR
PPPAC	Prime Minister	• Guide Office of PPP, line Ministries to expedite • Break down bottlenecks • Review progress at national level
CCEA	Finance Minister	• Approve guidelines, procedures, model docs • Review contingent liability for Large projects • Approve incentives • Approve 'In Principle' for Med and Large; Approve Large • Approve org. structure of PPP Cell • Recommend PPP-related laws
Office of PPP	CEO	• Prepare model docs and guidelines for approval • Promote PPP projects to investors • To select a panel of experts and transaction projects • Support line Ministries/impl. Agencies in formulation, pre-feasibility, feasibility, technical and contractual parameters • Build capacity of line Ministries/impl. Agencies on PPP • Monitor PPP projects • Prepare and manage budget of PPP Cell
Line Ministry/ impl. agency	Minister	• Initiate, develop, pre-qualify, tender and award PPP projects • Oversee implementation based on concession agreements • Recommend incentives • Proactively involve Office of PPP for own capacity building
Finance Division	To be specified	• Issue procedures and guidelines for financial participation by the government • Approve funds for TA for proposed and VGF for selected projects based on concession agreements • Channelize funds for infrastructure financing
Planning Commission	To be specified	• Fast-track Linked Components (part of ADP) • Review ADP to prevent duplication

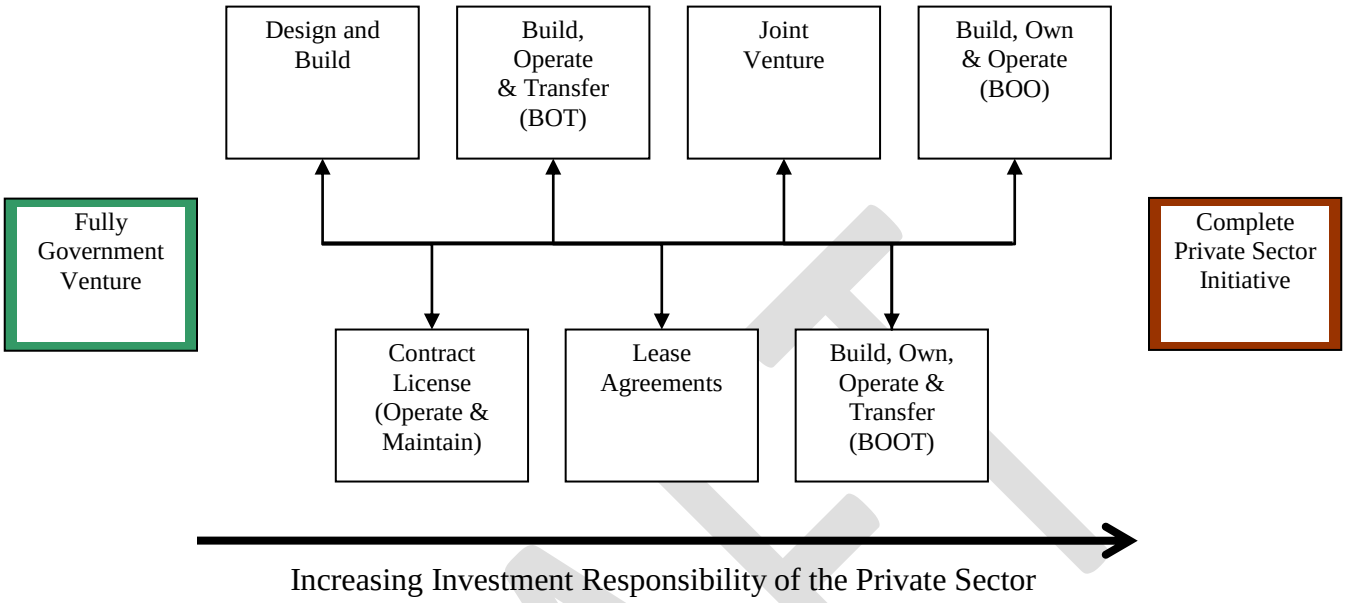
FIGURE 1. STEPS, TIME LINE AND RESPONSIBLE SUTHORITIES FOR VARIOUS SIZES OF PROJECTS



FINANCING

Figure 2 shows various existing models and investment responsibilities by the government and private sector. The investment responsibilities depend on the scope of return on investment and role of public entity in service delivery. According to Figure 2, in the "design and build" model the government bears 100% investment, whereas in the "build, own & operate (BOO)" model, only the private sector is supposed to invest [World bank, 2007]. However, such framework has some limitations as many ICT projects even under BOOO model may need contribution of the government.

FIGURE 2. TYPES OF PPP MODELS – CURRENT PATTERN INVESTMENT RESPONSIBILITIES OF PRIVATE SECTOR



Source: Evalueserve Research, from World Bank, 2007

Although private sector is the main investor in PPP projects, there is a need for financial participation of the government in certain cases. For example, a system of online and mobile phone-based safety-net benefit delivery for the marginalized citizens is a priority for the government. If such projects seem to be better pursued through PPP route, then charging a fee for receiving safety-net benefit might not be appropriate and a private sector player may need to be compensated (if corporate philanthropy is not an option). For accommodating such special kinds of projects, the government designed some mechanisms for financing. The PPSD identifies at least 3 forms of government participation in PPP projects, depending on the nature of the projects and models of PPP adopted for a particular type of project (section 9). A list of possible models is presented in Annex A.

a. Technical Assistance Financing : The Technical Assistance Financing is designed for the following purposes basically for the ministries and relevant government agencies :
   i. Pre-feasibility and Feasibility study for projects to be conducted by the line Ministries and government implementing agencies;
   ii. Preparation of RFQ and REP documents for projects by the Office of the PPP;
   iii. Preparation of concession contracts for projects by the Office of the PPP;
   iv. PPP related capacity building in the line Ministries/implementing agencies and other relevant agencies;

b. Viability Gap Financing: Viability Gap Financing (VGF) is meant for the private investors for the projects where financial viability is not ensured but their economic and social viability is high. VGF could be in the form of capital grant or annuity payment or in both forms. VGF in the form of capital grant shall be disbursed only after the private sector company has subscribed and expended the equity contribution required for the project. The VGF will be managed by the Finance Division and will be disbursed to the PPP Project entity, upon request by the line Ministry/implementing agency, as per the terms of the concession contract. For example, one project can generate enough revenue to generate profit for the private investor; however, it is not enough to recover capital investment or initial investment. In that case, private investor will be compensated by the government after spending the investment for preparing the infrastructure or service for public use. There might be a case that revenue from the planned service in enough for covering capital investment and partial operating cost, but fails to generate profit for the private investor. Here, the government can pay the difference in form of annuity. It is also possible that both capital cost and operating cost are reimbursed to the private party and a service fee is paid to it. Such arrangement is possible when the government is convinced that rveneu generation is not required or possible due to the nature of service to be provided. There might be question, if the government pays for everything, then what is the justification of PPP. The justification may be that the private party brings in innovation, expertise and efficient delivery of service, which is not possible to ensure by the government.

c. Infrastructure Financing: The infrastructure financing is an arrangement for extending financing facilities for the PPP projects in the form of debt or equity through specialized financial institutions such as Bangladesh Infrastructure Finance Fund (BIFF) and Infrastructure Development Company Limited (IDCOL). The government may participate in such financing arrangements through necessary budget provision. The detailed procedure and guidelines for all forms of financial participation by the government will be issued and specified by Finance Division with the approval of the CCEA. This particular arrangement is necessary for projects, where private sector investment is not possible to mobilize fully and a support form the government may accelerate project implementation.

Such financing options have been designed to attract private sector to come forward with investment proposal and offer services to the citizens, which have been reserved to be provided only by the public sector and are not enough attractive for revenue generation. Basically, the idea is bringing in private sector efficiency in public service delivery and make it lucrative enough for them.

Incentives for the Private Investors: The PPSD proposes various fiscal and non-fiscal incentives for the private investors for launching PPP projects in priority sectors. All incentives in PPP, including fiscal and monetary incentives are to be considered and granted by the government,

through the appropriate agencies of the government. The purpose of the incentive is to reduce cost of doing business and protection of return to the private sector.

Fiscal incentives may include, inter alia, reduced import tax on capital items under PPP projects; and tax exemption or reduced tax on profit from operating/managing for a specific time period.

The PPSD also keeps provision for special incentives for PPP projects targeted for rural areas and fo runderpreviledged population. Non-resident Bangladeshis will also be eligible for special incentives. Special incentives is subject of approval by the CCEA. Generally, it is applicable for projects, which are identified by the government and request for proposal document (RFP) will mention about this. However, such incentives may also be applicable for unsolicited proposals.

The special incentives are a manifestation of the government commitment towards making services accessible to the poor and marginalized people. Such incentives are expected to attract private players to go to rural areas or to financially less profitable service delivery.

Inviting Innovations for ICT Projects: The PPSD focuses on invitation of innovations from private investors. This is reflected in the guidelines for large, medium and small projects, where unsolicited projects are invited. In the process of selection of winning private party, the private investor, who initiated a proposal, qualifies automatically for technical responsiveness. Thus, an originator of the idea gets preferential treatment in the process of selection. In the ICT projects in health, education or ICT infrastructure projects, unsolicited proposals will thus get advantage over others, at the same time they remain subject to competition. In the financial bidding, there is a scope for adopting 'Swiss Challenge Method', where private party submitting unsolicited proposals gets chance to offer competitive price against the lowest price quote.

OPPPORTUNITIES

The PPSD has opened a door of opportunity for the government and private sector to work together to leapfrog in materializing the strategic priorities and action items, mention in the ICT Policy 2009.

Priority PPP Projects: A survey was conducted by the World to understand the priority of PPP projects and the result of the survey shows priority by two major ICT associations [Table 1].

Table 1. Areas of Priority in ICT Projects for Private Players in Bangladesh

ICT PROJECTS	**BCS**		**BASIS**	
	Interested in PPP	Priority	Interested in PPP	Priority
G2C				
Tax related	✓	▲▲	✓	▲▲▲

ICT PROJECTS	**BCS**		**BASIS**	
	Interested in PPP	Priority	Interested in PPP	Priority
Social Benefits related	✓	▲▲	✓	▲▲▲
Property related	✓	▲▲	✓	▲▲▲
Agriculture related	✓	▲▲▲	✓	▲▲▲
Education based	✓	▲▲▲	✓	▲▲▲
Health based	✓	▲▲▲	✓	▲▲▲
Tourism related	✓	▲▲	x	--
G2B				
Tax related	✓	▲▲▲	✓	▲▲▲
Corporate Compliance related	✓	▲▲▲	✓	▲▲▲
e-Procurement	✓	▲▲▲	✓	▲▲▲
Auctions	✓	▲▲	✓	▲▲
Treasury Automation	✓	▲▲	✓	▲▲

Source: World Bank, 2007; *Note: High Priority ▲▲▲, Medium Priority ▲▲; Low Priority ▲

Considering the outcome of the survey as a basis of interest of the private sector from supply side, the priorities are identified in agriculture, education and health sectors in G2C segment. In G2B component, the priorities are in taxation, corporate compliance and procurement. The individual sectoral strategic priorities and priorities for enabling environment also match from the demand side. By matching the two sides a few priority areas have been drawn below, where individual line ministries/ implementing agencies and private investors may come forward to launch PPP projects. There are projects, which are in the strategic priority list, but not presented here, as they are less suitable for PPP and more suitable for outsourcing to private sector or suitable as public owned service delivery.

TABLE 2. PRIORITY AREAS FOR PPP IN VARIOUS SECTORS

AREA	PRIORITIES
Equitable Citizens' Access	Broadband connected towns and villages with affordable connectivity for all institutions (including public access venues) through national level and local level private entrepreneurship creation
	Content creation and dissemination for various target audiences, specified by the government
Vibrant ICT Industry	Creation of joint ventures for providing industry-related skills to fresh graduates
	Create specialised technology parks for providing end-to-end services to ICT industry
	Create Bangladesh Next Branding for tapping outsourcing business
Education	Implementation of ICT-based education in all primary and secondary educational institutions through a holistic approach (power solution, lab, multimedia classroom, curriculum, monitoring and mentoring, sustainability)
	Mobile telephony and wireless network based education delivery programmes
	Education content (formal, non-foromal and life-long learning) development and broadcasting through specialised education channel
Health	Launching mobile phone based health services (tele-consultation to tele-diagnostics) linked with service delivery institutions to ensure a complete cycle of health care
	Launching integrated RTI related services for proper access to health care service and medicine and other entitlements of citizens
	Online skills upgradation system for medical professionals
Agriculture	Joint initiative of agriculture research institutions (crop, fisheries, livestock and forestry) to provide access to latest invention to the farmers through a network of physically located ICT-based extension service network
	Launching mobile phone based agriculture extension services (tele-consultation) linked with service delivery institutions in the whole value chain of agricultural production starting from soil testing up to market access and e-commerce
Access to Justice	Online and mobile-phone based case process management service
	Online and mobile-phone based law enforcement related

	service (e.g. GD entry)
Disaster Management, Environment and Climate Change	Computer based GIS modelling for prediction of cyclone, sea-level rise, river erosion, rain and drought and delivery to citizens through television, radio and mobile phone (e.g. flash messages) ICT-based local level environmental data generation and compilation through local ICT public access venues and mobile phone through mobilisation of citizens' groups Damage, loss, need assessment (DLA) services to the government agencies
Social Safety Net Programme (SSNP)	Launching integrated RTI related services for proper access to safety net benefits and other entitlements of citizens (ATM network in rural areas for) Providing SSN benefits to various target groups in collabroation with central and local government agencies
Land	Land record management and land related service development capacity building for the relevant government authorities Online and mobile-phone based land and property tax collection service to the citizens
Commerce and Investment	Trade facilitation related system development and service delivery to corporate citizens through One-stop information service for foreign and local investors through website, call centre and physical resource centres. Digital certification services for corporate and individual citizens Online license and registration services through a de-centralised country-wide network

STRATEGIC PRIORITIES

The line Ministries will work with the Office of the PPP to identify and formulate PPP projects and invite private sector to come forward for their implementation. The Office of the PPP will coordinate among various government and private agencies for accelerating approval and implementation of PPP projects. At least five projects will be identified and developed under each ministry to be initiated in each fiscal year. In identification of projects strategic priorities in vertical and horizontal segments of the "Strategic Priorities" document will be consulted.

The Office of PPP will develop a comprehensive five year plan under which PPP projects will be identified and contribution of the government to those projects will be estimated. These estimates will be included in the national budget in each fiscal year.

The Office of the PPP will undertake programmes for building capacity of government officials and private sector participants in collaboration with development partners so that project identification and approval process strictly follow stipulated time frame and handled with professionalism.

The office of the PPP will design programme to raise awareness about potential of win-win-win benefits for private sector, government and citizens of the country. Promotional materials, road show at home and aboard, workshop and other appropriate programmes will be undertaken so that private sector feels confident and pro-actively participate in PPP initiative.

The Office of the PPP and the line Ministries and implementing agencies will encourage private sector to come forward with unsolicited proposals where private sector innovation and dynamism will be leveraged for offering e-services to citizens.

The office of the PPP will develop specific guidelines for offering tailor made incentives for PPP projects by sub-sector and by priority, which will be followed by the ministries for offering spcial incentives for a particular project.

The office of the PPP will work with similar government agencies abroad to share views and exchange experiences to understand the best practices and to make the PPP initiatives in Bangladesh vibrant and effective.

The Office of the PPP and the line Ministry will work with the development partners to engage them in PPP projects for participating either in government contribution or investment by the private sector.

The Office of the PPP will follow state-of-the-art online process for proposal submission, processing, decision making and implementation progress tracking with individual interface for each Ministry and implementing agency.

The private sectors' concern are loss of ownership of concept (innovation) in the process of appraisal and approval and delay in approval and disbursement financial resources related to project implementation (VGF). The main ingredient of PPP in e-service delivery is innovation, which have clear intellectual property rights provision. Conceptualization of projects and design are also costly proposition. Due to lack of security of property rights, private sector partners may be reluctant to come forward for PPP. To avoid such situation, in case of single sourcing, a non-disclosure agreement (NDA) and compensation for violating intellectual property rights shall be incorporated. Furthermore, suitable selection method like "Swiss Challenge Method" shall be adopted. For avoiding loss form delay in approval and disbursement financial resources related to project implementation a compensation clause for such delays shall be incorporated in the consession agreement with selected private party.

The approval process of complex and large projects in terms of financial outlay and geographical coverage vis-a-vis small projects are not the same. The process of approval of

small projects has been kept simple for encouraging innovative but small institution to join the PPP initiatives. On the other hand, ICT projects will involve more than one regulatory entity and ministries. For example, connectivity is one of the big issues and role of BTRC would be very important. In some cases, Ministry of Information may also be involved. Coordination among the relevant agencies and providing one-stop service will be essential for ensuring 'big-push' in PPP projects in ICT sector. The Office of PPP will give that push for completing the approval within stipulated tiem frame.

The risk assessment framework will be devised in new guidelines for the PPP projects in ICT sector.

To protect the interest of the government and to ensure best possible design of services, there will be provision for hiring technical advisers.

In a few flagship projects in a particular sector, the government will have to assume more risks than the private investors. This will provide right signal to the possible participants in the private sector. Further guidelines will be developed, where possible duration of PPP projects will be between 20 years to 30 years, depending on the nature of the projects.

A number of good practices for processing PPP projects are recommended for the line Ministries. They are:

a. Standard model contracts for infrastructure shall be prepared, to be used consistently or improved) in similar types of projects. The standard model contracts shall cover the responsibilities and risks allocation between the government and the investor;
b. The line Ministries and Executing Agencies shall always prepare contract documents with their own lawyers and experts;
c. The broad design parameters and specification shall be finalized before tendering. All tenders submitted must have the same scope, performance and design quality;
d. Local investors shall be encouraged through awareness creation, motivation etc., to participate in infrastructure projects;
e. Local goods, equipment and services shall be encouraged, where it is possible in terms of cost, quality and timely delivery;
f. Executing Agencies will be encouraged to become more commercially oriented and carry out projects through joint ventures with the private sector;
g. The focus of the Government will be to speed up new projects and avoid the approach of maximizing revenues at the expense of slower delivery;
h. A local point of private infrastructure projects shall be set up in each line Ministry, depending on the necessity.

For ICT projects, the pre-qualification criteria will be determined for two purposes:

- to encourage participation of local private entities into innovative projects;
- to ensure participation of small private entities, as the difference between small private entities and large entities is very big. This rule would ensure some sort of 'anti-trust' approach.

The Office of the PPP will detrermine general criteria for financial evaluation, where the following aspects, among others, will be considered:

- Lowest present value of tariff, tolls, fees or charges
- Highest present value or percentage of revenue sharing, where a project has enough revenue generation potential;
- Lowest present value of financing over contract period;
- Firm commitment for ongoing investment, capacity expansion, more connection etc.
- Highest present value of lease payment or rent, where applicable;
- Lowest present value of management fees.

Based on the analysis of projects by revenue generation potential and parameters, a simple matrix of procurement scope will be considered, an outline of which is presented in Table 3.

TABLE 3. PROCUREMENT PARAMETERS OF ICT PROJECTS UNDER PPP

REVENUE GENERATION POTENTIAL	**SELECTION CRITERIA**
	COMPETITIVE BIDDING
Services with full cost recovery	■ Highest Composite Index on KPI ■ Lowest cost ■ Highest revenue sharing
Services with partial cost recovery (in many cases, fixed cost recovery is not possible)	■ Highest Composite Index on KPI ■ Highest fixed cost investment by private sector ■ Total lowest recurring cost
Public good (citizens' entitlement)	

Financing: A common allocation will be kept with the Ministry of Finance for meeting financial needs for PPP projects under all relevant ministries. There is no need for ministry-wise allocation. The allocation of resources may be done on first-come first serve basis, which will ensure competition among ministries for rolling out projects identified under the ICT Policy 2009.

The success of a PPP project in ICT sector largely depends on the design of economically viable business models and self-sustaining schemes for delivery of e-services. Most private players will be interested in government ventures, only if there is a possibility of significant returns on the risk taken by the company. Different business models have been tried out in many countries in a number of PPP e-Government projects. The most successful ones involve variable compensation to the private company, as opposed to fixed. Table 4 summarizes the most common business models tested in other countries for e-government projects, based on variable compensation to the private player across various e-Government domains.

Table 4. e-Government PPPs – Possible Business Models by e-Government Domain

E-SERVICE DOMAIN	**PROJECT FINANCING MECHANISM**	**RETURNS TO THE PRIVATE PARTNER**	
		1	2
Tax and Customs	User charges as fees for service enhancement from citizens and businesses	% Share of the fees, per transaction	% share of additional revenues made possible by improved audit and collection programs
e-Procurement	User charges as fees for service enhancement from participating government agencies, subscription fees from prospective suppliers	% share of the amount of bid (with an upper cap on the total amount)	% share of the subscription amount
Certification and Licensing	User charges as fees for service enhancement from citizens and businesses (in addition to the usual fees charged for issuing certificates and licenses)	% share of the service enhancement fees	--
Social Benefits Related	Viability gap funding User charges as fees for service enhancement from the government	% share of the service enhancement fees, per distribution	--
Health and Education	Viability gap funding User charges as fees for service enhancement from the government	% share of the service enhancement fees, per distribution	--
Source: Evalueserve Research			

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ANNEX A: PPP MODELS

PPP Models: There are at least seven models for undertaking and implementation of PPP projects. A few of the available models are elaborated below with examples of projects.

Contract License (Outsourcing): Under this model, ownership of facilities remains with the government, service providing venture or vehicle may be jointly owned or fully owned by the private sector and the private entity provides specific set of services as per mutual understanding. There are two types of contract services:

- Operations, Maintenance and Management: A public partner contracts with a private partner to provide and/or maintain a specific service. Under the private operation and maintenance option, the public partner retains ownership of the public facility. The private partner maintains the facilities and provides services to the citizens. In some cases, private partner may invest capital in the facility. Establishment and service delivery in community e-centres located in local government infrastructure, computer labs in educational institutions may be good projects under this model. The revenue from the services may fully go to the private partner, in some cases, the government may cover the gap in viability for providing services. Ensuring operational efficiency is the motivation for such partnership.

- Operations and Maintenance: A public partner contracts with a private partner to provide and/or maintain a specific service. Under the private operation and maintenance option, the public partner retains ownership and overall management of the public facility. The revenue from the services may fully go to the private partner, in some cases, the government may cover the gap in viability for providing services. Providing safety-net benefits to poor citizens through digital media, providing on-line tax filing services to the citizens, providing on-line procurement services are a few example where such model can be applied.

Build Own and Operate (BOO): In this model the private sector or a consortium designs, builds, and operates a facility or service delivery over its lifetime. The private entity remains sole owner of the facility or group of assets. Government usually does not manage the infrastructure developed under this model. The private entity bears the operating revenue risk and retains any additional revenue gains. This model is commonly adopted by governments in projects that involve large scale deployment of human resources to maintain the facility for its entire life time. At present Independent Power Producer (IPP) are operating under BOO model in Bangladesh. A variation of the model is applied for providing services in the areas, where business is not viable, but the government finances the gap of viability for a certain period, which depends on the scope of creating effective demand. Providing high speed Internet connectivity to the rural areas may be a good example, where the private sector may build the infrastructure for last mile connectivity and offer Internet connection at an affordable price, and the government can pay for the gap in viable business operation.

Build Operate and Transfer (BOT): Under the BOT model a private entity or consortium designs, builds, and operates a facility or service delivery for a certain period of time, after which the government takes over the facility or service delivery and knowledge and operational responsibilities are transferred to the government. Depending on the revenue generation scopes, the government finances and bears operating revenue risk. However, in some cases, the government does not invest at all. In return, it retains additional gains in the project. The model is used in various e-government and other infrastructure projects across the world. Sometimes, the private sector remains responsible for maintenance of the facilities. Thus, it is also called as design-build-operate-maintain (DBOM) model. Land record management and land registration services may be a good project under this model, where the government does not have to pay for building the system, and private sector may introduce the services and recover investment from revenue sharing.

Built Own Operate and Transfer (BOOT): This is an extended version of the BOT model. Under this model the ownership and management belongs to the private sector until a specified time. After expiry of the term, ownership and management is transferred to the government. This model is adopted for projects of systems that are self sustainable and require little effort and skill from the government for maintenance, after contract with the private entity is ends. Chittagong Customs House Automation by Datasoft Systems and Automated Railway reservation and ticketing system by Technohaven Ltd. are examples of PPP under the model. Return on investment is generally high for projects under this model.

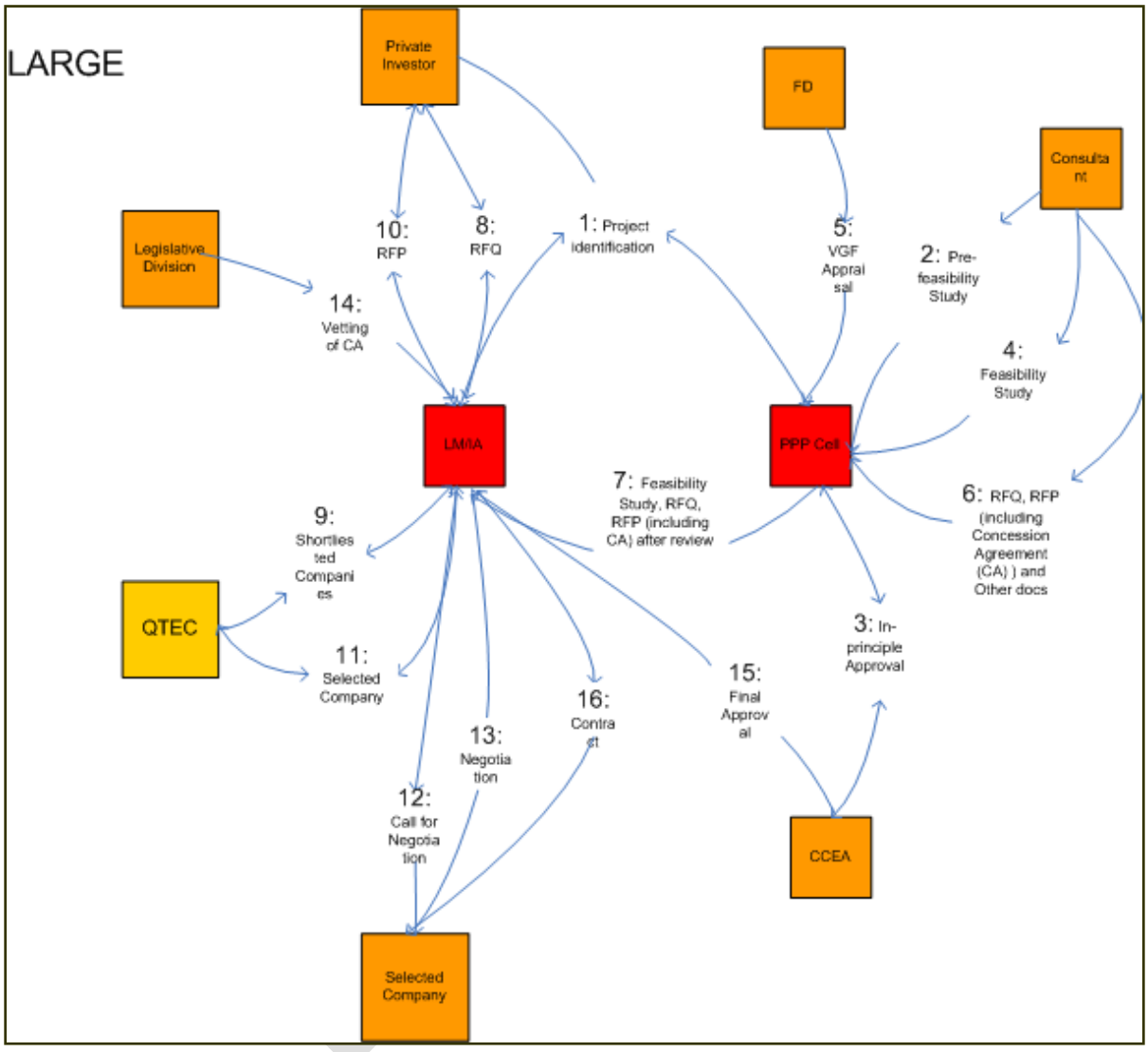
Buy-Build-Operate (BBO): A BBO is a form of asset sale that includes a rehabilitation or expansion of existing public infrastructure. The government sells an asset to the private sector entity, which then makes the improvements necessary to operate the facility in a profitable manner.

Lease Agreement: This model is applicable for an infrastructure, which is turned into service delivery through its innovative use. The private partner has right to generate revenue under this model. GrameenPhone leasing of fibre optic network of the Bangladesh Railway is an example of PPP under this model.

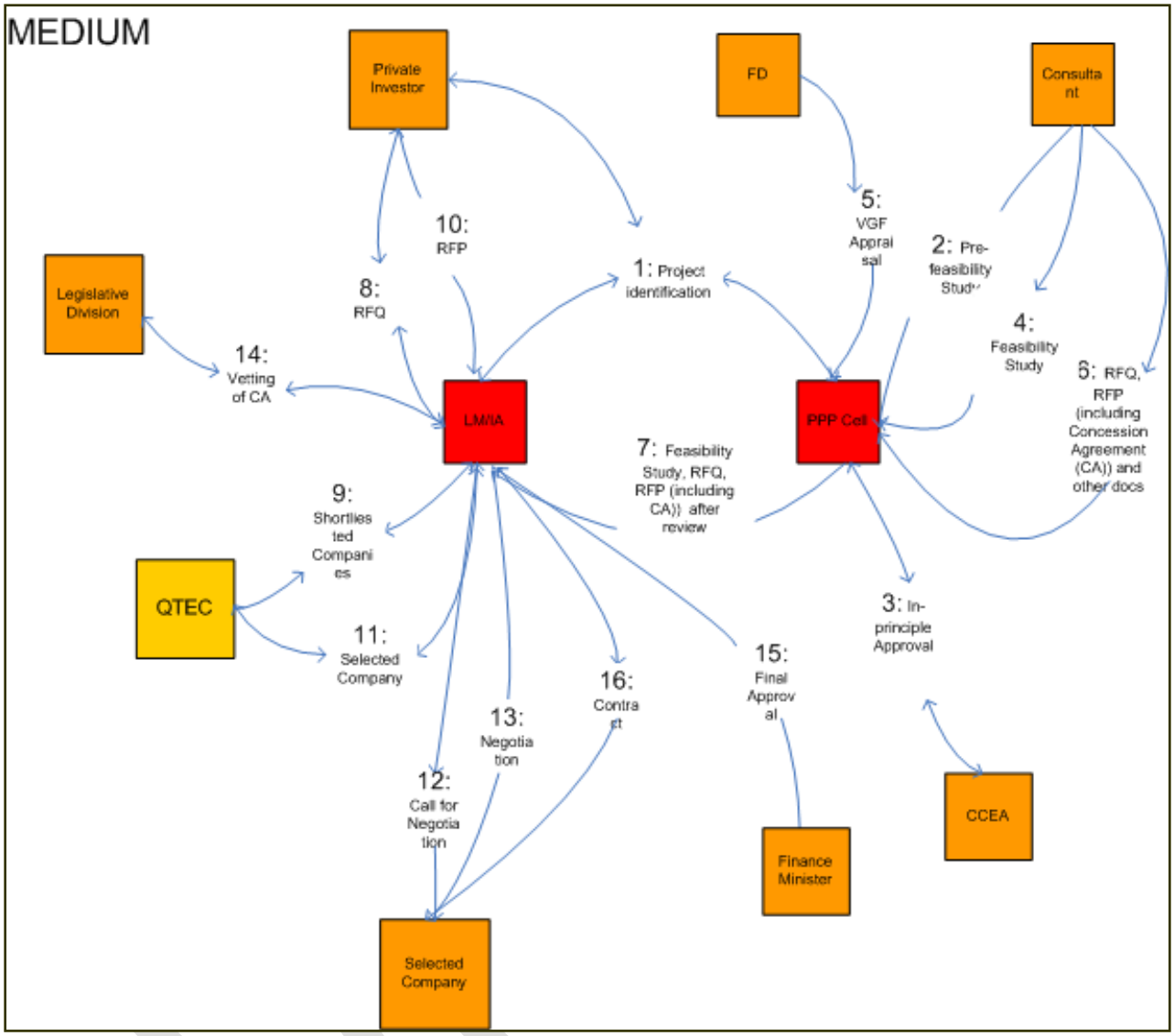
There may be a number of variations in PPP models and it depends on the arrangements between the government and the private company. These arrangements can clearly spell out the sharing of risk and returns between the contracting entities.

ANNEX B. PROCESS FLOW FOR SMALL, MEDIUM AND LARGE PPP PROJECTS

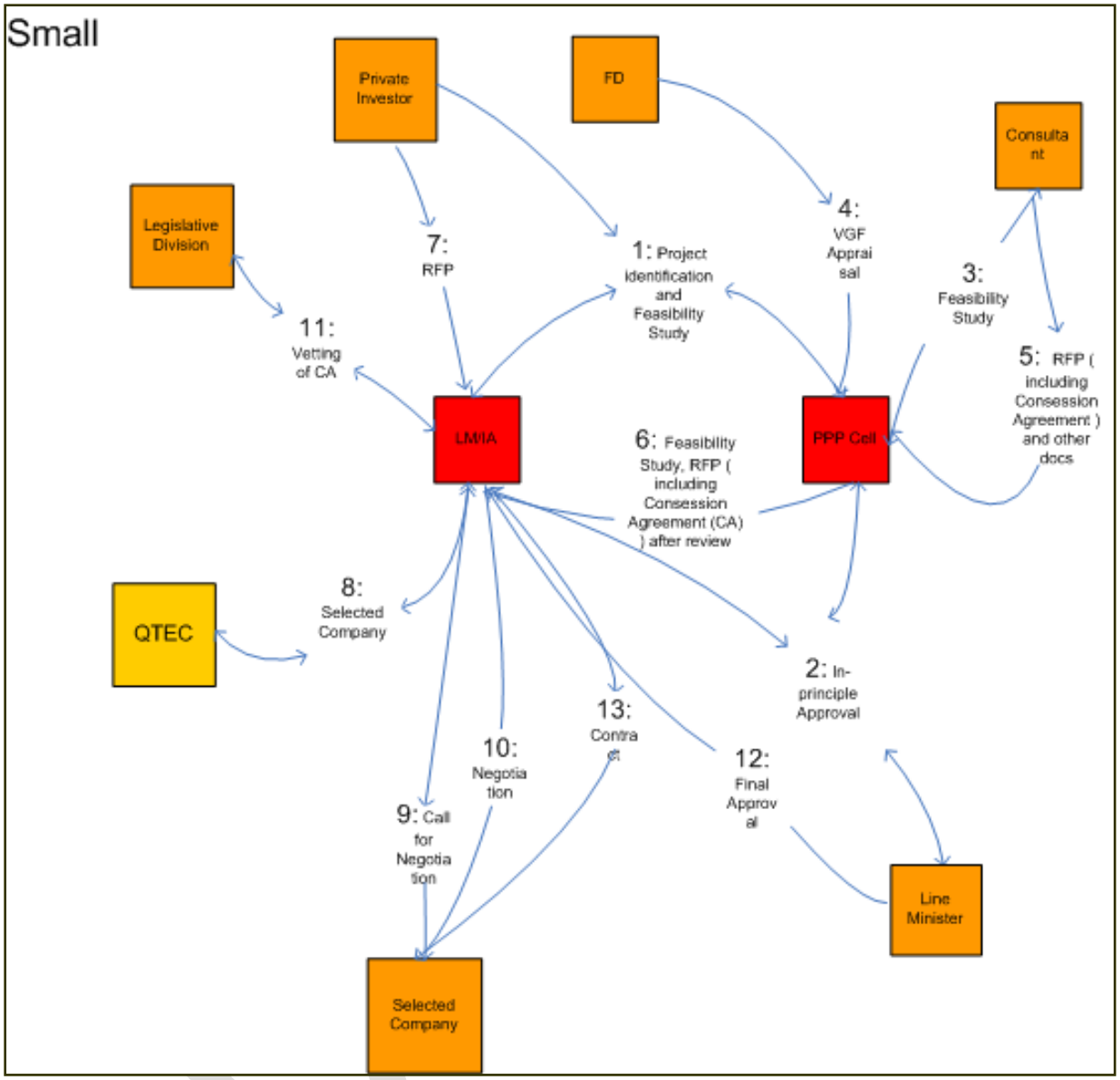
LARGE



Medium


MEDIUM
Private Investor
FD
Consultant
10: RFP
5: VGF Appraisal
2: Pre-feasibility Study
Legislative Division
8: RFQ
1: Project identification
4: Feasibility Study
14: Vetting of CA
LMTA
PPP Cell
6: RFQ, RFP (including Concession Agreement (CA)) and other docs
7: Feasibility Study, RFQ, RFP (including CA)) after review
9: Shortlisted Companies
QTEC
3: In-principle Approval
11: Selected Company
15: Final Approval
16: Contract
13: Negotiation
12: Call for Negotiation
CCEA
Finance Minister
Selected Company

Small


Small
Private Investor
FD
Consulta nt
Legislative Division
7: RFP
1: Project identification and Feasibility Study
4: VGF Apprai sal
3: Feasibility Study
11: Vetting of CA
5: RFP (including Consession Agreement) and other docs
LMIA
PPP Cell
6: Feasibility Study, RFP (including Consession Agreement (CA)) after review
QTEC
8: Selected Company
2: In-principle Approval
13: Contra ct
10: Negotia tion
12: Final Approv al
9: Call for Negotia tion
Line Minister
Selected Company

ANNEX C. PPP GOOD PRACTICES IN INDIA AND BANGLADESH

ICT projects are relatively new under PPP framework and involvement of private sector adds a new dimension to the complexity of projects. However, there are many success stories in ICT projects across the world. The successes give confidence that PPP in ICT projects are not a theoretical proposition, rather the success depends on a focused approach and clear guideline.
e-Seva of Andhra Pradesh in India is one of the success stories about how a government can offer e-government and business services to the citizens. This is a project implemented under the "BOOT" model. Under the project, the private sector digitised the physical records of the government of Andhra Pradesh, integrated the back-end across the participating government agencies and departments, developed online portal for service access, and built and operated e-Seva centres, the public access venues for accessing developed services by the citizens. Under the project, government agencies and municipalities are charged for the services made available through e-Seva. The fee for providing these services online is INR 5 per transaction. Returns to the private consortium are in the form if share in the revenue generated form fees charged apart from the budgetary support during the pilot phase.

Another example of success in PPP is the project "Bhoomi", from Karnataka, India. This is a project of online delivery of land titles to rural farmers in the state of Karnataka and establishing an accurate and genuine land record system built with an efficient database for periodic update of land records. Under the project farmers are charged INR 15 as fees for obtaining the printed copies of RTC certificates at the telecentres in villages. Returns to private sector party are in the form of sharing revenues generated through fees charged to the users of Bhoomi. Here, INR 10 goes to the private vendor and IVR 5 goes to the revenue Department.
PPP Practices in Bangladesh: It is important to note that, only infrastructure related projects are currently listed with Private Infrastructure Committee (PICOM) under PPP. They are: Grameen Phone Network Expansion Project, Pacific Telecom Network Expansion Project, Ranks Tel PSTN Project, DNS Satcomm Satellite Earth Station Project, BanglaTrac International Communication Gateway Project, M & H Telecom Interconnection Exchange Project, and Shoanchalok ICT Programme [MOF, 2009].

One of the earliest PPP projects in Bangladesh is Automation of Railway reservation and Ticketing System. In 1993-94 Bangladesh Railway awarded the national reservation & ticketing system to Technohaven on BOT basis. Technohaven built the system during 1994-95 and operated the system till 2002. During this period Bangladesh Railway's inter-city passenger revenue increased from BDT 480 million to BDT 1.10 billion while reducing ticketing staff from 400 to less than 200. The productivity gain was more than 200%. It also reduced cost and harassment of the passengers.

Under the “Support to ICT Task Force” programme (SICT) five projects were identified for implementation: land records, results of public exam, foreign and local investment related information, government forms, and payment of utility bills. Among the identified services, results of public exams, government forms and payment of utility bills were implemented successfully and scaled up. Among these three services payment of utility bills is an example of

PPP, where the mobile telecom operators offer the facility to pay the utility bill through mobile phone and consumers pay for the service through charge for sms. The infrastructure is built by the operators. This is an example of PPP under BOO model.

The latest success in PPP is 'Chittagong Customs House Automation project'. DataSoft implemented the project and it was launched in October, 2008. This project was financed by different stakeholders such as Chittagong Chamber of Commerce & Industry (CCCI), Chittagong Customs House and DataSoft. CCCI invested BDT 10 million, Customs House BDT 14.3 million, and accumulated amount from other stakeholders and DataSoft was BDT 24.3 million respectively. The government of Bangladesh didn't have to pay a single penny for the system. The Automation System was developed to increase revenue and check irregularities through enhancement of its efficiency. Because of successful automation solutions provided by DataSoft, the 42 steps lengthy process has been curtail to only 5 steps, Bill of Entry cost reduced BDT 180 to BDT 50. The introduction of full automation and user-friendly procedures helped Chittagong Customs House check the evasion of revenue of at least BDT 3.5 billion and double the revenue earnings which now stands at BDT 150+ billion a year. Also, it has reduced the cost of doing business by at least 70%, saving custom processing time by 80%, established transparency and level playing field for business and doing better risk management.

3.I. ENABLERS OF DIGITAL BANGLADESH

KEY PROBLEMS	• A comprehensive ICT-enabled policy and legal framework is absent for all vertical and horizontal aspects of economy and society • Outdated laws and new laws do not talk to each other and create scope of manipulation • Standard practices are missing in policy formulation and law enactment • Inadequate knowledge and awareness in issues like privacy, IT security and cyber security • Inadequate knowledge for interoperability, standard practices, open standards and architectures etc.
VISION	A modern ICT-enabled policy and legal framework through a process of comprehensive legal reform.
OUTCOME	Policies and laws affecting sectors are reformed and new policies and laws are enacted for a thriving knowledge-based society.

STRATEGIC PRIORITIES

INTEROPERABILITY FRAMEWORK

Interoperability will ensure an integrated government and critical information exchange between different agencies. With this interoperability government's service providers can build independent systems however, will be interoperable with other vendors systems. This will also help citizens acquire different services from different agencies in one virtual space in long run thus making citizens' interaction with government easy and efficient.

NATIONAL POPULATION REGISTER

At present the Election Commission (EC) has a large database called the National ID (NID) database of over 85 million voters with information on each voter. This list is being continuously updated and currently the EC is optimizing the database to ensure easier management and faster access. This database is the foundation for National ID platform will be at the center of government's service delivery for all of its citizens. This will make all the citizens of all ages more secure and make government mush more efficient and cost effective. The NPR will have information about all the citizens, their relationships and as well as their bio-metric information. The NPR can serve as the basis of citizen's common digital platform and service bus. This can also be the digital identity of citizens that can work for all government's ICT-based services delivery bus and also some services from the private sector.

CYBER SECURITY

Ensuring the security of National ID platform and the other similar govt. websites linked to it is another very important concern and is getting due attention. Once completed, these databases are going to contain information of all citizens, making security a big concern. So, privacy and access control of the data are being given utmost importance. More detailed discussion on security concerns around NID database can be found in National ID section. Security of information passed through mobile and online banking is another concern; Bangladesh Bank is currently working on a guideline for m-banking and e-banking.

KNOWLEDGE MANAGEMENT

Government officers will strive to explicitly encode their knowledge into a shared knowledge repository, such as a database, as well as retrieving knowledge they need that other officers have provided to the repository. This is also commonly known as the Codification approach to KM. Another strategy to KM involves officers making knowledge requests of experts associated with a particular subject on an ad hoc basis (pull strategy).

SHARED SERVICE DELIVERY

Sharing license of software across government agencies will omit the need for recreating the same software for different organizations since government always but software with codes and appropriate licenses. Sharing infrastructure will reduce infrastructural and social cost and e-waste ensuring. For example, every agency will not require their own data center they can easily share BCC's datacenter. To the extreme end sharing one server using virtualization to store data of multiple organizations will save on hardware, electricity, transportation cost and space. Using hardware that is designed to minimize energy consumption, these will all reduce carbon footprint while keeping the individual agency's privacy and accountability intact.

LEGAL FRAMEWORK

Arrival of the internet and service delivery through internet resulted a new set of complex legal issues. This was followed by outsourcing government services to private sectors and international companies, which led to further complications. The government of Bangladesh

INTRODUCTION

A comprehensive ICT-enabled policy and legal framework is absent for all vertical and horizontal aspects of economy and society. Outdated laws and new laws do not talk to each other and create scope of manipulation. Standard practices are missing in policy formulation and law enactment. Inadequate knowledge and awareness in issues like privacy, IT security and cyber security. Inadequate knowledge for interoperability, standard practices, open standards and architectures etc.

VISION

A modern ICT-enabled policy and legal framework through a process of comprehensive legal reform

OUTCOME STATEMENT

Policies and laws affecting sectors are reformed and new policies and laws are enacted for a thriving knowledge-based society

SITUATION ANALYSIS AND STRATEGIC PRIORITIES

EQUITABLE ACCESS

Equitable access is about addressing possible social and economic imbalances when developing policies and rolling out ICT-based infrastructure and services, so that people from all corners of the country have similar opportunities when it comes to accessing and using technology. Equitable access is one of the first mentions in the National ICT Policy 2009, first among its 10 objectives, where the policy states: “Ensure social equity, gender parity, equal opportunity and equitable participation in nation-building through access to ICTs for all, including persons with disabilities and special needs” and also the first out of its 10 strategic priorities, suggesting mainstreaming of the disadvantaged groups and bridging digital divide for lower income groups, ethnic minorities, women, and persons with disabilities and special needs.

Government has initiated a variety of projects to ensure equitable access and participation of all citizens - establishing around 5000 Union Information and Services Centres (UISC) at union level by 2010 is one such initiative; followed by one-stop service centers being planned for upazila and district levels. Following the 8th strategic priority of the policy which focuses on ensuring universal access through extending internet and IP telephony to all citizens within 5 years, a Domestic Network Coordination Committee (DNCC) has been formed to coordinate efforts of different govt. bodies in laying fibre optic cable across the country, enabling high speed internet in rural areas. A Rural Connectivity Policy guideline to ensure last mile connectivity is currently being drafted by this committee. Various services are already being provided through mobile phones. Policy guidelines are being developed for enhance m-governance and m-banking experience. The National Telecom Policy has been revised and a broadband policy has been drafted. All these initiatives together will take government services

at the doorsteps of all citizens irrespective of socio-economic status, gender, religious belief, disability and other factors.

STANDARDIZATION AND INTEROPERABILITY

Interoperability is a property referring to the ability of diverse systems and organizations to work together (inter-operate). The term is often used in a technical systems engineering sense, or alternatively in a broad sense, taking into account social, political, and organizational factors that impact system to system performance. Interoperability is a property of a product or system, whose interfaces are completely understood, to work with other products or systems, present or future, without any restricted access or implementation. This will ensure an integrated government and critical information exchange between different agencies. With this interoperability government's service providers can build independent systems however, will be interoperable with other vendors systems. This will also help citizens acquire different services from different agencies in one virtual space in long run thus making citizens interaction with government easy and efficient.

Speaking from an eGovernment perspective, interoperability refers to the collaboration ability of cross-border services for citizens, businesses and public administrations. Exchanging data can be a challenge due to language barriers, different specifications of formats and varieties of categorisations. Many more hindrances can be identified.

If data is interpreted differently, collaboration is limited, takes longer and is not efficient. Hence eGovernment applications need to exchange data in a semantically interoperable manner. This saves time and money and reduces sources of errors. Fields of practical use are found in every policy area, be it justice, trade or participation etc. Clear concepts of interpretation patterns are also required.

Many organisations around the world are dedicated to interoperability. All have in common that they want to push the development of the World Wide Web towards the semantic web. Some concentrate on eGovernment, eBusiness or data exchange in general. In Europe, for instance, the European Commission and its IDABC programme issue the European Interoperability Framework. They also initiated the Semantic Interoperability Centre Europe (SEMIC.EU). A European Land Information Service (EULIS) was established in 2006, as a consortium of European National Land Registers. The aim of the service is to establish a single portal through which customers are provided with access to information about individual properties, about land and property registration services, and about the associated legal environment. In the United States, the government's CORE.gov service provides a collaboration environment for component development, sharing, registration, and reuse and related to this is the National Information Exchange Model (NIEM) work and component repository.

Interoperability is an very important issue for law enforcement, fire fighting, EMS, and other public health and safety departments, because first responders need to be able to communicate during wide-scale emergencies. Traditionally, even agencies in the developed

world could not exchange information because they operated widely disparate hardware that was incompatible. In America for example agencies' information systems such as computer-aided dispatch systems (CAD) and records management systems (RMS) functioned largely in isolation, so-called "information islands." Their agencies tried to bridge this isolation with inefficient, stop-gap methods while large agencies began implementing limited interoperable systems very recently. These approaches were inadequate and the nation's lack of interoperability in the public safety realm become evident during the 9/11 attacks on the Pentagon and World Trade Center structures. Further evidence of a lack of interoperability surfaced when agencies tackled the aftermath of the Hurricane Katrina disaster[iv]. We can learn from these and leapfrog our initiatives and design effective interoperability framework.

Standardization is the process of developing and agreeing upon technical standards. A standard is a document that establishes uniform engineering or technical specifications, criteria, methods, processes, or practices. Some standards are mandatory while others are voluntary. Voluntary standards are available if one chooses to use them. Some are de facto standards, meaning a norm or requirement which has an informal but dominant status. Some standards are de jure, meaning formal legal requirements. Formal standards organizations, such as the International Organization for Standardization (ISO) or the American National Standards Institute or our BSTI are independent of the manufacturers of the goods for which they publish standards. The goals of standardization can be to help with independence of single suppliers (commoditization), compatibility, interoperability, safety, repeatability, or quality.

We need standardization of web interface designing, policy and security practices, solution implementation, government IT contracts, document formats, data formats, common systems for government such as HR, accounts etc. Standardizations will also ensure quality of service provided by the service providers.

Standardization is the reason for the success of Internet, e-commerce and the emerging wireless revolution. It provides more options, better security and no interoperability difficulties - public sector systems are interconnected and hence give better citizen and business services at lower cost and risk. Bangladesh govt. has already started developing standardization policy guideline and is promoting open standard, “Promote the use of cost-effective, open source and open architecture solutions” is a strategic priority (strategic theme 10.4) of the National ICT Policy 2009. The policy also talks about establishing interconnectivity across government offices for effective data sharing (strategic theme 3.3) and establishing govt. interoperability framework, which will be adhered by all govt. ICT projects.

The journey towards Digital Bangladesh has caused a sudden rise in the use of ICT based solutions in various government agencies and departments. Bridging the island like systems housed in different govt. bodies early on will enable easy communication and exchange of information among these separate systems, saving effort and cost of repeated data entry, data conversion and other interoperability issues. Also future systems will be developed following a set standard.

Government is acting fast to set up interoperability standards, a committee is designing architecture of a National ID based central system/database where different GOs can access this system for gathering and crosschecking information. Bangla typing within govt bodies is being standardized through use of UNICODE based Bangla fonts. All ministries have gradually started using UNICODE, which will finally solve the age old problem of readability of documents between ministries using different systems, improving the consistency and efficiency of data collection and reducing data redundancy among other benefits. Websites of all ministries are being standardized, with same look and feel.

Learning from mistakes made by pioneering countries, government has started setting interoperability standards early hoping to leapfrog the initial inefficient stages of digital journey. We also need to standardise web interfaces so that citizens will have easy understanding and usage of government sites across different agencies.

NATIONAL POPULATION REGISTER (NPR)

With the vision of Digital Bangladesh Government is working on designing and developing a NPR for Bangladesh which will be at the center of governments service delivery for all of it's citizens. This will make all the citizens of all ages more secure and make government mush more efficient and cost effective. The NPR will have information about all the citizens, their relationships and as well as their bio-metric information. The NPR can serve as the basis of citizen's common digital platform and service bus. This can also be the digital identity of citizens that can work for all government's ICT-based services delivery bus and also some services from the private sector.

The Population Register is a computerized national register that will contain basic information about Bangladeshi citizens and foreign citizens residing permanently in Bangladesh. This register will also have information on service delivered to citizens and about their other ID systems ie. Passport, licenses etc. The information in the system will be used throughout the government's information services and management, including in public administration, elections, taxation, judicial administration, research and statistics. Businesses and other private organizations can also gain regulated and limited access to the information if necessary.

Basic information related to the identification of people and house hold will be registered in the Population Register. Personal data recorded in the system will include name, personal identity code, address, citizenship, gender, address, family relations and date of birth and death (if applicable) etc. The register will also have limited household information.

At present the Election Commission (EC) has a large database called the National ID (NID) database of over 85 million voters with information on each voter. This list is being continuously updated and currently the EC is optimizing the database to ensure easier management and faster access. This database is the foundation for National ID platform. Recent study reveals that only this database is not enough for all service delivery and also lack information on citizens and their relationships which is very important for government's service

delivery not only authentications. Other government agencies are also developing or planning similar large databases, for example birth registration database, family database through health census, population census database, Social Safety Nets (SSN) database integrating different ministries' SSN programs, tax payers' database, passport database. Govt. is planning to inter-connect and integrate these databases with NPR platform to allow different govt. bodies access each other's resources and databases instantaneously, share electronic files and documents and communicate more efficiently.

To link and make government's database interoperable with each other, a National Information Management Committee has been formed which is expected to recommend ways to develop the NPR platform into a 'cradle-to-grave' e-service delivery platform through which all relevant government agencies can take their services at doorsteps of every citizen.

DESIGNING A COMBINED CENSUS.

One serious concern is security and privacy of a NID platform as this is going to contains information on all citizens of Bangladesh and people can actually be tracked using this database. Some of the issues to be looked into are as follows:

- What should be done if someone loses the ID card, if s/he doesn't remember the number and does not have a photocopy (as that could be a common case for rural and urban poor), replacement procedure for misplaced ID will have to be easy.
- ID card bearer should be present to receive the services provided against that card in order to ensure that only card bearer and no one else is the beneficiary of the services meant for him/her. Misuse of social safety nets fund can be reduced this way.
- Government personnel dealing with National ID should be strictly monitored and their background should be thoroughly investigated to make sure that they are not biased for or against any particular group or identity such as socio economic class, ethnicity, religion, gender, political affiliation, and will not misuse the National ID information in any way.
- It is imperative to put in place stringent laws to protect privacy and security of citizens to prevent incidents such as identity theft, misuse of National ID information by government personnel or state itself (e.g. during elections) and so on.

INFORMATION AND CYBER SECURITY

Information is the lifeblood of today's organizations, a vital asset in today's IT-enabled world, especially for governments. IT systems and networks link organizations and individuals through myriads of data and services. This poses significant opportunities as well as challenges with respect to vulnerability if data is accessed by unwanted sources. Thus to guarantee access and availability to high-quality information and services information systems will be designed and built in a way that are effective at gathering, analyzing and outputting the information and

service that citizens need and can secure the information systems against risks to their confidentiality, integrity and availability of information and service.

ICT Policy states as a strategic priority "Create supportive legal framework for IPR protection, online document sharing, transactions and payments." (strategic theme 10.2) The need for ensuring data security and privacy over internet is greater than ever following the rapid increase in internet based services and information. The govt. is prompt to respond - a group of national experts is currently drafting national cyber security policy guideline. This guideline contains generic policy directions on security of data over the internet, applicable to any individual or organization, and also specific directions on handling emergencies like cyber attack, including duties of national cyber security committee as well as organization level committees.

Ensuring the security of National ID platform and the other similar govt. websites linked to it is another very important concern and is getting due attention. Once completed, these databases are going to contain information of all citizens, making security a big concern. So, privacy and access control of the data are being given utmost importance. More detailed discussion on security concerns around NID database can be found in National ID section.

Security of information passed through mobile and online banking is another concern; Bangladesh Bank is currently working on a guideline for m-banking and e-banking.

There is a multiplicity of benefits in planning for business continuity within the organization. Not only the data, hardware, software, etc., be better protected, but the officials that compose the organization will be better safeguarded would a disaster occur. In addition, officers will be informed and rehearsed as to what actions to take to immediately start the recovery process and ensure business continuity if disaster strikes and provide better service to citizens and all the stakeholders. Putting business continuity plans into practice, the government will be better prepared for potential disaster, help ensure that the organization will be able to maintain continuity of business practices, and reduce or even possibly remove the effect such calamities could have on the organization.

SHARED RESOURCES

While implementing ICT based projects, government's cost, time and effort can be saved to a great extent through sharing resources such as licenses, codes, infrastructure, content and most importantly human resources. Shared resources, including human, technical, and processes can be honed to create more efficient output than dedicated resources. For example, if a 24x7 monitoring and management solution is required, the cost of resources required for one agency can create a barrier to entry, but the scalability of those resources, both human and machine, can easily accommodate multiple agencies with limited further investment. We have very limited resources with the government sharing them will also ensure faster learning, lower cost, faster implementation and most importantly better and efficient use of tax payers money.

Sharing license of software across government agencies will omit the need for recreating the same software for different organizations since government always but software with codes and appropriate licenses. Reusing codes of software or replicating a system will save cost, time and effort on separately developing systems for each government organization to accomplish similar functions; code sharing will also allow customization of a system to fit the requirements that may vary slightly across organizations.

Sharing infrastructure will reduce infrastructural and social cost and e-waste ensuring. For example, every agency will not require their own data center they can easily share BCC's datacenter. To the extreme end sharing one server using virtualization to store data of multiple organizations will save on hardware, electricity, transportation cost and space. Using hardware that is designed to minimize energy consumption, these will all reduce carbon footprint while keeping the individual agency's privacy and accountability intact.

To share content, Govt. has recently launched a beta version of an online livelihood content repository where e-contents on all livelihood segments including health, education, agriculture and law are being stored. Over 40 major GOs and NGOs are currently involved in this venture and a mechanism is being developed for organizations to become members and upload their content in this repository which will then be examined and published by a central authority. Thus a mechanism is now in place to share and use contents owned by various agencies. This online repository and offline version of it will be used by telecentres/information centres throughout the country enabling general people's access to huge resources.

To take content development and sharing to the next level, Bangladesh is planning to launch an award for the best livelihood e-contents to encourage the NGOS and GOs to develop high quality e-content, an initiative in the line of the very successful Manthan Award South Asia.
The number of ICT based government projects has escalated in the past year, giving rise to a significant shortage of ICT literate Human Resources in the government to implement and manage these projects. Recruiting and capacity building of the large number of human resources required in ministries and government agencies will take time and considerable effort, and it is costly. In this context, sharing human resources across govt. agencies seems the most effective way to efficiently manage and implement the ICT based projects. If different government organizations share a common pool of human resources for maintenance and troubleshooting of their systems and if possible much more, this will increase efficiency and reduce cost, and also free up fund for recruiting more diverse and high skilled professionals. Accordingly, Bangladesh govt. is establishing an 'ICT Directorate' under the Ministry of Science and ICT. Once established, this 5000 staff strong ICT directorate will provide coordinate ICT projects and provide IT support to ministries and govt. bodies up to upazila level.

Government organizations having similar needs will share a single set of services to meet those needs instead of creating separate mechanisms for each organization. Shared services focuses on delivery of a particular service or services in the most efficient and effective way as a way of gaining economies of scale and other benefits. Policy directions will be developed for implementing shared services where needed. NID platform is one such example. Benefits of

shared services include: better decision making resulting from centralized control and management along with greater access to information; resource savings which leads to freeing up resources for re-investment, upgrading infrastructure and equipment becomes cost effective, seamless service delivery (one-stop shop) and improved security.

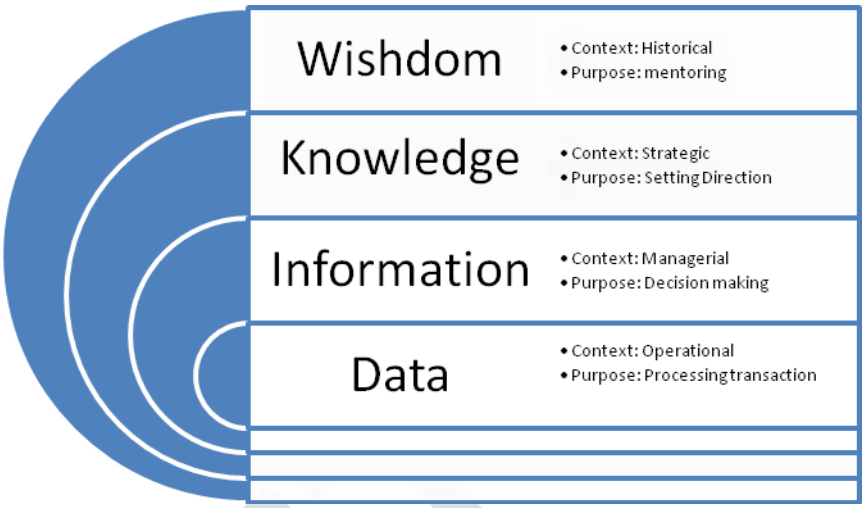
USE AND MISUSE OF DIGITAL RESOURCES

ICT Policy's strategic theme 1.5 states "Bring to focus children's issues, including protection of children from harmful digital content". Laws will be in place to protect minors from abuse through Internet, mobile phones and land phones, from accessing pornographic material or other ways of abuses. It will also prevent adults' access to pornographic material using minor persons, or material containing footage of an adult person without his/her consent, and protect men and especially women from abuse through misuse of photos and other content over internet and mobile phones. Service providers will abide by certain guidelines regarding content that passes through their servers. Laws would be stringent enough to keep them always vigilant over the passing content.

e-Waste is a significant emerging problem worldwide, given the volumes of e-Waste being generated and the toxic and valuable materials in them. Reduction in e-Waste involves mitigating the direct negative impact of computers and electronic devices, their power consumption as well as economic and social cost associated with manufacturing, maintenance and disposal of components. Following ICT Policy's strategic priority 9.4 which emphasizes ensuring safe disposal of toxic wastes resulting from use of ICTs, govt. will be developing recycling plan in collaboration with GOs and NGOs specializing in this field. Also network and data centres will be designed in a way to make them more energy efficient. Use of alternative energy sources such as solar, wind, bio-fuel are being explored as suggested in ICT Policy action item 267.

KNOWLEDGE MANAGEMENT

Knowledge Management (KM) comprises a range of strategies and practices used in an organization to identify, create, represent, distribute, and enable adoption of insights and experiences. Such insights and experiences comprise knowledge, either embodied in individuals or embedded in organizational processes or practice. Knowledge Management efforts typically focus on organizational objectives such as improved performance, competitive advantage, innovation, the sharing of lessons learned, integration and continuous improvement of the organization. KM efforts overlap with organizational learning, and may be distinguished from that by a greater focus on the management of knowledge as a strategic asset and a focus on encouraging the sharing of knowledge. KM efforts can help agencies to share valuable organizational insights, to reduce redundant work, to avoid reinventing the wheel per se, to reduce training time for new employees, to retain intellectual capital as employees turnover in an agency, and to adapt to changing environments.



There are several strategies to KM. One strategy to KM involves actively managing knowledge (push strategy). In such an instance, officers will strive to explicitly encode their knowledge into a shared knowledge repository, such as a database, as well as retrieving knowledge they need that other officers have provided to the repository. This is also commonly known as the Codification approach to KM. Another strategy to KM involves officers making knowledge requests of experts associated with a particular subject on an ad hoc basis (pull strategy).

Other knowledge management strategies and instruments for government should include:

- rewards (as a means of motivating for knowledge sharing)
- storytelling (as a means of transferring tacit knowledge)
- cross-project learning
- knowledge mapping (a map of knowledge repositories within a company accessible by all)
- communities of practice (Develop role based communities among government officials)
- best practice transfer (Government can develop best practices for system design, development and implementations. They can also make a portal for Km which should include training materials, implementation challenges and their remedies, design considerations and officers through processes and decision trees etc.)
- collaborative technologies (groupware, etc.)
- knowledge repositories (databases, bookmarking engines, etc.)

Practicing knowledge management will help our government share their experiences, successes and failures, important learning etc. This will enable shorter implementation path for further implementation of similar systems as well as making them cost effective. Through a Km practice different government agencies will not re invent the wheel every time rather than they will take the wheel towards perfection. Sharing such knowledge's will also save valuable human hours and make new officers more efficient. If we can extensively use the KM then we can make a new officer a expert on in shortest possible time. This will also help decision makers take more effective decision over time.

OPEN STANDARDS

An open standard is a standard that is publicly available and has various rights to use associated with it, and may also have various properties of how it was designed (e.g. open process). There is no single definition and interpretations do vary with usage. The terms "open" and "standard" have a wide range of meanings associated with their usage. There are number of definitions of open standards which emphasize different aspects of openness, including of the resulting specification, the openness of the drafting process, and the ownership of rights in the standard. The term "standard" is sometimes restricted to technologies approved by formalized committees that are open to participation by all interested parties and operate on a consensus basis. Open standards which specify formats are sometimes referred to as open formats.

Open standards have many legal and organization definitions. However we are referring to it as stated by the World Wide Web Consortium's and Digital Standards Organization definition.

The participative/inclusive process leading to a particular design, and the supporting resources available with it should be accounted when we talk about Open Standards:

- transparency (due process is public, and all technical discussions, meeting minutes, are archived and referencable in decision making)
- relevance (new standardization is started upon due analysis of the market needs, including requirements phase, e.g. accessibility, multi-linguism)
- openness (anybody can participate, and everybody does: industry, individual, public, government bodies, academia, on a worldwide scale)
- impartiality and consensus (guaranteed fairness by the process and the neutral hosting of the W3C organization, with equal weight for each participant)
- availability (free access to the standard text, both during development and at final stage, translations, and clear IPR rules for implementation, allowing open source development in the case of Internet/Web technologies)
- maintenance (ongoing process for testing, errata, revision, permanent access)

The Digital Standards Organization (DIGISTAN) states that "an open standard must be aimed at creating unrestricted competition between vendors and unrestricted choice for users". Its brief definition of "open standard" (or "free and open standard") is "a published specification that is immune to vendor capture at all stages in its life-cycle". Its more complete definition as follows:

- "The standard is adopted and will be maintained by a not-for-profit organization, and its ongoing development occurs on the basis of an open decision-making procedure available to all interested parties.
- The standard has been published and the standard specification document is available freely. It must be permissible to all to copy, distribute, and use it freely.
- The patents possibly present on (parts of) the standard are made irrevocably available on a royalty-free basis.
- There are no constraints on the re-use of the standard.

The European Union adopted the following definition in its European Interoperability Framework. To reach interoperability in the context of pan-European eGovernment services, guidance needs to focus on open standards. The word "open" is here meant in the sense of fulfilling the following requirements:

- The standard is adopted and will be maintained by a not-for-profit organisation, and its ongoing development occurs on the basis of an open decision-making procedure available to all interested parties (consensus or majority decision etc.).
- The standard has been published and the standard specification document is available either freely or at a nominal charge. It must be permissible to all to copy, distribute and use it for no fee or at a nominal fee.
- The intellectual property - i.e. patents possibly present - of (parts of) the standard is made irrevocably available on a royalty-free basis.
- There are no constraints on the re-use of the standard

Bangladesh government should develop their own definition of open standards based on these three definitions. However, the importance is that we need to develop or adopt open standards for Digital Bangladesh implementations. Without the standards we will not be able to speed up the initiatives and will run into conflicts between different systems. Adopting to an open standard will ensure interoperability with worldwide community and part of a continuous development process. A lot of open standards later adopted by organizations like ITU, ISO, ANSI, ARMA, AIIM and EU. This will also safe guard government from technology upgrades in the ever changing world. Open Standards also lower total costs (TOC) and increase returns on investment (ROI) by providing the following benefits:

- Interoperability, Simple and quicker integration
- Vendor neutrality
- Efficient use of existing resources
- Greater use of automation
- Flexibility
- More options provide more opportunities to optimise
- Lower and managable risk
- Robustness and durability
- Quality
- Increase available skills
- Better human communication

PUBLIC KEY INFRASTRUCTURE

Public Key Infrastructure (PKI) is a set of hardware, software, people, policies, and procedures needed to create, manage, distribute, use, store, and revoke digital certificates. In cryptography, a PKI is an arrangement that binds public keys with respective user identities by means of a certificate authority (CA). The user identity must be unique within each CA domain. The binding is established through the registration and issuance process, which, depending on the level of assurance the binding has, may be carried out by software at a CA, or under human

supervision. The PKI role that assures this binding is called the Registration Authority (RA). For each user, the user identity, the public key, their binding, validity conditions and other attributes are made unforgetable in public key certificates issued by the CA. Bangladesh Government has already developed the CA authority under Bangladesh Bank and now currently working on setting up the infrastructure and service.

Without PKI lots of eGovernence initiatives will slow down due to security and signature issues. This will also help developing paper free office for government and citizens have paper free filing services. Among lots of benefits PKI will enable the followings which are very much needed for Digital Bangladesh initiatives:

- Smart card log-on
- Digital signature
- Software code signing
- Secure e-mail
- Secured messaging
- Encrypted file system
- IP security
- Web authentication and encryption for better authentication and access
- VPN
- Port based Authentication for wireless networks
- One ID/Signature per citizen for different government service

SOME OF THE USAGE OF PKI FOR DIGITAL BANGLADESH

PASSWORD MANAGEMENT AND SSO

- There are many problems managing network services usernames and passwords in the real world
- PKI offers the best solution for cost-effectively securing network applications for government without driving citizens crazy.
-

DIGITAL SIGNATURES

PKI should allow digital signatures, recognized by government as legal signatures:

- Reduce paperwork with electronic forms.
- Much faster and more traceable business processes.
- Improved assurance of electronic transactions (e.g. really know who that email was from).

ENCRYPTION

Easy to encrypt data for any individual without prior exchange of information – simply look up their certificate which contains their public key.

CITIZEN AND USERS CONVENIENCE

- Consistent mechanism for authentication that they only have to learn once.
- Same user credentials for authentication, digital signatures, and encryption – lots of payback for user's effort to acquire and manage the credentials.
- One credentials/signature for different government organization

COHERENT GOVERNMENT-WIDE SECURITY ADMINISTRATION

- Centralized issuance and revocation of citizens/user credentials.
- Consistent identity checking when issuing certificates.
- Same authentication mechanism for all network services.
- Leverage investment in tokens or smart cards across many applications/organizations.

INTEROPERABILITY WITH OTHER INSTITUTIONS

- Inter-institution trust allows identity verification and encryption using credentials issued by a trusted collaborating institution ie BB CA:
    - Signed forms and documents for business process (e.g. grant applications, financial aid forms, government reports)
    - Signed and encrypted email
    - Authentication to applications shared among institutions
    - Peer to peer authentication for secure information sharing

LEGAL FRAMEWORKS

Bangladesh has a detailed and well-defined legal system in place. Bangladesh laws do not cover aspects related to IT automations and the Internet, which have emerged recently. The arrival of the Internet and service delivery through internet resulted a new set of complex legal issues. This was followed by outsourcing government services to private sectors and international companies, which led to further complications. The government of Bangladesh has responded proactively in this sphere and has started to lay the foundations of the required legal framework.

To make Digital Bangladesh successful we will need the following legal and policy frameworks:

1. ICT Act
2. RTI Act
3. Copyright Act
4. Information and cyber security policy for making IT spaces more secure
5. Consumer protection act
6. Contracts act for making IT contracts more dependable
7. Specific relief act which is necessary for upholding confidentiality and privacy

We also need clear definitions for breach of confidentiality and privacy, hacking (Un authorized access, Specific relief, hacking etc.

At present, there are no information security specific laws in Bangladesh other than the Bangladesh bank's security directive. Government can adopt international standards for the agencies ie ISO 27002 and SOGP. Many countries has already adopted international standards and some made changes to the internationals standards to fit their legal requirements. However, with fast implementation of eGovernnce initiatives we to adopt these laws and standards practices fast otherwise the initiatives might face challenges which may result in shutting down the systems.

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