



**Technical Guidelines on Information and
Communications Technology (ICT) for Preparation
of the Tenth Five Year Plan (2008-2013)**

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1. Introduction

During the last three years, since the Ministry of Information & Communications (MoIC) was established, extensive consultations have taken place with all stakeholders including donors, seeking to harness Information and Communications Technology (ICT)¹ as tools of poverty reduction and sustainable development. Major achievements include the formulation of the Bhutan ICT Policy and Strategies (BIPS) endorsed by the Royal Government in July 2004 and enactment of the Bhutan Information, Communications and Media Act by the 85th Session of the National Assembly in July 2006. Ensuing discussions have revealed a broad consensus both on the key issues facing the ICT sector and on the value of a more focused, cooperative approach to tackling these issues. The increasing global acceptance of ICT as a tool to fighting poverty, eliminating gender discrimination and the timely priority accorded by the Royal Government to this sector form the basis for and provided the impetus to mainstreaming ICT in the policies, plans, programmes and projects of sectors, Dzongkhags and Gewogs in the formulation of their respective Tenth Five Year Plan (10FYP). ICTs, wisely deployed, can potentially impact almost every sector, making development budgets, private sector investments and commitments from development partners go that much further in terms of cost effectiveness, impact and reach.

These Technical Guidelines on ICT (hereinafter “the Guidelines”) sets out the necessary framework for mainstreaming ICT as a tool in sectoral development programmes, both at the central and local levels. Addressing the needs of the poor, and fostering pro-poor innovation and growth through the effective and innovative use of ICT, remains the core priority of the Royal Government. The key to making ICT relevant to broader policy and development challenges is understanding how ICT can serve strategically as tools of pro-poor change and instruments for achieving core development objectives, as embodied in the UN Millennium Development Goals and Bhutan’s development concept of Gross National Happiness (GNH).

The MoIC is the lead official agency for ICT development facilitated by its Secretariat comprising of the Policy and Planning Division (PPD) and Administration and Finance Division (AFD), and supported by the Department of Information Technology (DIT) and Department of Information and Media (DoIM). The Bhutan InfoComm and Media Authority (BICMA) is the regulatory body for the ICT and media market in Bhutan.

2. Rationale

ICTs can help to achieve the poverty reduction target set for the 10FYP through its power to create and transfer knowledge, improve the efficiency and transparency of institutions and

¹ ICT refers to a broad field encompassing computers, communications equipment and the services associated with them. It includes the telephone, cellular networks, satellite communication, broadcasting media and other forms of communication.

markets, and facilitate the participation and empowerment of the poor. In a fundamental sense, the diffusion of ICTs is crucial to information access and spread, and vice versa, and community effort can play a major role in the process.

ICT's direct contribution to poverty reduction, for example, can come either through the employment-generating effects of the diffusion of these technologies into poor rural and urban areas or through its effects of enhancing returns from economic activities undertaken by poorer households and women. Its indirect contributions can come through facilitating and reducing the costs of delivery of information and services that promote wage- and self-employment, raise productivity and improve the quality of delivery of employment-generating and poverty-alleviating projects being implemented by the Royal Government.

Thus, the wider recognition of harnessing ICT as tools of poverty reduction and sustainable development during the 10FYP and accordingly mainstreaming ICTs into sectoral development plans and programmes is appropriate. A great deal of innovation and experimentation in the use of ICTs has been carried out and strong evidence exists of the beneficial impact of ICT on development goals. Mainstreaming should involve not only subordinating ICT to broader strategies and goals, but also more effectively navigating the tradeoffs between ICT and other interventions in resource-poor environments and the links between ICT interventions and other elements of broader sectoral strategies (in education, health, rural development, etc.).

3. Key Considerations for the 10FYP

3.1 Partnerships. The 10FYP for the ICT sector relies on partnerships of all stakeholders: the Royal Government, the private sector, the civil society, and regional and international organizations, and cooperation at national and local levels in a collaborative, constructive and mutually supportive manner with the aim of building a Bhutan-relevant Information Society. Such cooperation would lead to a more responsive, enabling and participatory state for planning and execution that embraces all stakeholders.

3.2 Practicality. The 10FYP attempts to translate the National ICT Vision² into practically achievable actions to attain short-, medium-, and long-term objectives of building the Bhutanese Information Society, in which highly-developed ICT networks, equitable and ubiquitous access to information, appropriate content in accessible formats and effective communication can help people to achieve their potential, promote sustainable economic and social development, improve quality of life for all, alleviate poverty and hunger, aid education and health, and facilitate participatory decision-making processes.

3.3 Sharing and strengthening local knowledge for development. The 10FYP emphasizes programmes and projects that ensure ubiquitous, equitable and affordable access to information for educational, scientific, economic, social, political and cultural activities, leading to a vibrant public domain of information.

² With people at the centre of development, Bhutan will harness the benefits of ICT, both as an enabler and as an industry, to realize the Millennium Development Goals and towards enhancing Gross National Happiness. – ICT White Paper, October 2003.

- 3.4 Sustainable economic and technological development.** The 10FYP considers the ICTs as a driving force in cross-sectoral programmes for the promotion of a sustainable, dynamic and vibrant Information Society, and contributing to poverty alleviation, robust economic growth, significant increase in GNP, increased technological innovation and development.
- 3.5 Realizing knowledge societies.** The 10FYP addresses knowledge societies, providing capabilities to identify, produce, process, transform, disseminate and use information to build and apply knowledge for human development, built on knowledge creation, preservation, dissemination and utilization, as well as founded on pluralism and human needs and rights with principles of freedom of expression, universal access to information and knowledge, quality education for all and cultural and linguistic diversity.
- 3.6 Promotion and preservation of cultural and linguistic diversity.** The 10FYP takes cognizance of the sensitivity of the traditional societies in different parts of the country to the preservation of their values and lays due emphasis upon rightful use of ICTs respecting moral ethical standards and religious values of the communities.
- 3.7 Empowerment.** The 10FYP aims at promoting the use of ICT for empowerment of women, young, senior people and the physically disadvantaged.
- 3.8 Environmental impact.** The 10FYP attempts to create awareness about the use of ICTs for the conservation of our environment and promotes strategies to assess and deal with the impact of ICTs on environment.
- 3.9 GNH and MDGs.** The 10FYP will fully harness the potential of ICTs to enhance GNH and promote the development goals of the Millennium Declaration, namely the eradication of extreme poverty and hunger; achievement of universal primary education; promotion of gender equality and empowerment of women; reduction of child mortality; improvement of maternal health; to combat HIV/AIDS, malaria and other diseases; ensuring environmental sustainability; and development of global partnerships for development for the attainment of a more peaceful, just and prosperous world.

4. Challenges in Mainstreaming ICTs

Mainstreaming ICTs into the sectoral programmes and national strategies pose daunting challenges to policy-makers and other stakeholders alike. Even the recent popularity of “national ICT strategies” or “e-strategies” such as the BIPS has not diminished this mainstreaming challenge, since these ICT strategies are often disconnected from, or even seen as a distraction from, core development strategies and programmes. Furthermore, it requires not just the resources, but also (and as importantly) coherent strategies and policies and the capacity to design, implement and adapt them to changing circumstances. Finding the proper balance between public and private investment to support scaling up ICT access and applications, and creating a favorable environment for private sector investment and innovation, is one of the most difficult challenges facing decision-makers.

Nonetheless, the Royal Government recognizes the need to harness ICTs for poverty reduction and sustainable development. At present, however, ICT uptake is largely unequal; there are many Bhutanese whose lives have been barely touched by ICTs. Therefore, both the Government and private sector must work together to find solutions to the Digital Divide. The foundation for meaningful stakeholder cooperation and digital solidarity must be laid firm and strong. Without doubt, the ICT revolution is changing the course of history, and Bhutan must equip itself through aligning its policies and plans to be part of the Global Information Society.

5. The Concept of Mainstreaming

ICT is not an end in itself but an enabler. ICT supports new ways of providing traditional services and can address issues of access and quality in dramatic and effective ways. For example, through telemedicine, the benefits of specialists' consultation can be provided online to patients in remote corner of the country. In education, pupils and teachers can access online learning resources of the richest University. In agriculture, it is possible for farmers to consult with staff of the National and Regional Research Institutes and also access the rich knowledge on the subject through the Internet. Apart from these are applications that support the internal efficiency of the agencies such as accounting systems, information management systems, etc.

In Bhutan, the roadmap of ICT development is provided in the BIPS which describes the government actions in the area of infrastructure development, human resource development, applications and content development, private sector development and overall policy development.

The most relevant section of BIPS for mainstreaming of ICT during the 10FYP is related to the target wherein all sectors are required to put 75% of their services online by 2010. It may be mentioned that the current developments relating to telecom network expansion to the rural areas, the upgrading of its infrastructure to provide multimedia services and faster speed connections through fibre network and ADSL (Asynchronous Digital Subscriber Line), projects such as Thimphu WAN (Wide Area Network), Dzongkhags LAN (Local Area Network) and Community Information Centres will be critical factors in the successful deployment of any ICT applications targeted at the majority of our population. These are detailed below:

- LAN with Internet connectivity established in 20 Dzongkhags. The project will be completed by end of September, 2006.
- Thimphu WAN – A broadband fibre optic network to connect all government agencies in Thimphu is under construction. The project will be completed by end of 2006.
- Optical Ground Wire (OPGW) – Bhutan Power Corporation (BPC) and Bhutan Telecom (BT) have jointly completed a project on Optical Ground Wire of power transmission between Thimphu, Paro, and Phuentsholing and collaboration between these two major players will continue.
- Rural Telecommunications Project – BT is implementing this project to provide at least 10 telephone lines in each Gewog by end of 2006.
- Broadband Master Plan for the entire country is under development. The project will be implemented during the 10FYP.
- About 30 CICs being set-up in the rural areas and 40 more to be set-up within the current plan. During the 10FYP, another 200 centres will be established.

Further during the 10FYP, broadband facilities will be deployed in all the 201 Gewogs. All these will ensure high speed Internet connectivity between government offices in Thimphu, the Dzongkhags and Gewogs. Therefore, the government departments need to see how they can capitalize on this infrastructure with content and applications.

The following is a suggestive list of programmes/activities to help the different sectors in mainstreaming ICTs into their 10FYP plans and programmes:

Agriculture:

- Use of ICT by farmers to obtain timely market information, to bypass intermediaries and to obtain better prices for their produce;
- Support farmers and herders in co-management of land resources through making local maps and GIS available in community information centers;
- Farmers can use ICT to have more accurate information on the factors that are needed to increase crop yield (farm management using ICTs);
- Facilitate research and development, and information-sharing on agricultural farm extension technologies and approaches (such as the development of effective seed technologies).

Health:

- Increase access of local healthcare workers to specialist support and remote diagnosis, and deliver healthcare services through tele-consultation to rural populations (which is commonly known as telemedicine);
- Enable health establishments to increase access to health information through various forms of ICTs, for example, radio or television programmes and the Internet;
- Enhance the delivery of basic and in-service training for healthcare workers, and serve as a medium of continuing education or lifelong learning for healthcare professionals to keep abreast of the latest knowledge;
- Use ICT to effectively respond to disease epidemics through sharing lessons, treatment practices and guidelines with healthcare professionals, researchers and policy makers.

Education:

- ICTs can complement traditional teaching resources through distance education, online learning and non-formal education;
- Improve educational management by designing student, teacher and administrative databases;
- Strengthen existing computer labs and departments in schools, colleges and institutions across the country;
- Deploy ICT to network schools (e.g. SchoolNet) and institutions for information-sharing and fill resource gaps;
- Computer simulation, telematics, video-audio, computer conferencing and virtual learning, along with educational TV and radio, have the potential to reach larger audience than possible through the traditional classroom;
- Develop educational software that uses ICT as a tool to aid innovative thinking, problem-solving and processing skills;

- Use ICT to link colleges and institutions with research institutions and countries abroad to exchange research ideas, acquire interdisciplinary knowledge, solve special technical problems on-site, share public information, compare methodologies and report new achievements.

Employment:

- Using electronic job markets, employers and employees can match labour skills and availability to satisfy demands;
- Outsource non-core operations to the private sector and concentrate on core organizational functions;
- Create jobs at the local level by establishing community information centers (such as Internet cafés, telecenters, public calling booths, ICT centers, etc.).

Environment:

- Establish Internet-based communities to raise awareness and disseminate information on environmental protection and sustainability;
- Promote use of electronic devices for monitoring of toxic waste disposal;
- Create a free-access website that tracks industrial emissions;
- Use of GIS and satellite remote sensing techniques in natural resources management (e.g. collecting information relating to sensitive and vulnerable forest and watershed areas, management of potential or actual calamities such as in tracking and managing forest fires and landslides).

Others:

- Increase access to information on credit opportunities for creating enterprises;
- Facilitate access to new, domestic and overseas markets for local products and services (e.g. for selling local arts and crafts);
- Disaster relief at the local level – Finding the kinds of crisis sooner and helping with distribution of supplies to affected areas;
- Establishment and management of Gewog/community/village web portals;
- Encourage digital archiving of oral tradition and other local content.

The above list is only illustrative and it is neither exhaustive nor should it be considered prescriptive. It may also be helpful to note that the Government will be undertaking major application developments as part of the e-governance project that require cross-sectoral integration and consultations. Some of these are as follows:

1. **Personnel Mail Management System.** This will provide a common platform for government servants to communicate to each other, including directories of the contacts.
2. **Human Resource Management System.** This will include recruitment, promotion, transfer, training and education, leave and personnel emolument. The basic platform for this is already available within the Zhiyog system. Additional features need to be incorporated to enable agencies to submit online requests and forms and receive online approvals. The system should also be directly connected to security and audit clearance systems as certain decisions are contingent on such clearances.

3. **Financial Management System.** This requires the enhancement of BAS and new modules to enable online requests and approvals. BAS has to be also realigned to take into considerations the three-year rolling budget system. As a further step, this system should also facilitate the online transfer of funds to the relevant accounts in the bank.
4. **Stores Management System.** A lot of staff time is spent in maintaining stock and issue registers of equipment and stationery within the agencies. This could be fully automated through a system which will include an inventory and issue system. While reducing staff time, this would also help curb the misuses of such items.
5. **Documentation System.** As the government moves towards more e-based management and correspondences, there is a need to establish a record system wherein relevant electronic files will be archived. Amongst others, this includes correspondences, policy documents, circulars, regulations, etc. Like the paper-based files, these should be available for access by authorized personnel in the different agencies. This system will include also a system of document tracking for the active cases. This will include receipt and dispatch and records of file locations etc.
6. **Geographical Information System (GIS).** Many government agencies require spatial data to plan and monitor their sectoral activities. A number of GIS systems have already been developed by individual sectors to fulfill their requirement. However this has limited capability and use. The single GIS system will incorporate the needs of all sectors and the government. This will involve studying the systems in place such as (GPIS in Planning Commission), (GIS MOA), (GIS Census Commission), (GIS Power), (GIS City Corporation), (GIS Telecom), (GIS Survey). All these have to be integrated in one standard application and be made available for all government agencies. This should also provide the space for other sectors to add their own layers of information. The individual agency should be responsible for annual update of the information as well as authorizing the level of access to specific information. Lead agency for the overall GIS shall be the National Statistical Bureau.
7. **Border Management System**
Some work has already gone into this. Coordinated by the Home Ministry, this involves the integration of systems within the Revenue & Customs Department, Tourism, Ministry of Foreign Affairs (Visa), Ministry of Human Resources and Labour (Labour Net), Ministry of Agriculture and the Royal Bhutan Police. The system enables the sharing of information, human resources, infrastructure amongst these agencies.
8. **Health Management Information System**
Some of the features of this system could include:
 - i) Basic health and nutrition information and services
 - ii) Patient record and history system
 - iii) Tele-medicine
 - iv) Online booking of beds in the wards
 - v) Online appointment with specialists
9. **Education Net**

Some of the features of this system will include:

- i) Online curriculum materials
- ii) Online teaching models, for example mathematical concepts
- iii) Support to teachers such as help in lesson planning
- iv) Online courses for teachers
- v) Other information related to career, value education, extra-curricular programmes.

10. **Land Record.** This is one of the basic information required to access rural credit schemes. The land record system of the Department of Survey should be upgraded to enable online access from the Dzongkhags and Gewogs and at a later date enable online transactions and approvals.
11. **Agriculture Management Information System.** This is already under development by RNR. It will include all information about crops and animals and marketing of the rural products.
12. **Rural-based Services.** The following services could be facilitated online for the rural population: (i) Timber and firewood permits, (ii) Loan schemes (iii) Marriage certificates (iv) Death and birth registration. (v) Other modules could be added as and when required.
13. **Trade Licensing and Handling System.** This should facilitate the online processing and approval of licenses. The current system in MTI can be upgraded to facilitate this.
14. **One Window Utility Billing and Payment System.** Water and sewerage, electricity and telephone bills can all be paid through a one window system. The billing for all these utilities have already been computerized and at present, electricity and telephone bills can be paid in either in Bhutan Telecom or Bhutan Power Corporation offices. All that is required is for the City Corporation to become part of this. Further integration of the billing systems may be required to enable all bills to be paid in one counter. The next level of development should be to facilitate online view of the bills and payment system.
15. **Personnel Income Tax Payments.** The PIT system can be upgraded to enable online submission of tax returns and payments.
16. **Security Clearance System (SCS).** This is one of the most important documents required for obtaining other government services. However, the present system is time consuming and causes a lot of inconvenience for the public. The issuance of security clearance is carried out manually through the submission of paper based forms which are validated and checked by two different organizations - Royal Bhutan Police and the Ministry of Home and Cultural Affairs. Using ICT, it is possible to make the system much more efficient and reliable. Applicants could obtain the clearance certificate from the nearest Dzongkhag RBP branch office. One key component of the SCS is the Crime Information System which could be based on CIPA system used in India.
17. **E-Procurement.** Some agencies have already started providing tender notices online, while others provide facility to download tender documents. However e-procurement in its real sense requires much more features including online tracking of the status of the evaluation process, features to help shortlist the applications and automating the sorting of specific bid

items to help the evaluation processes. An essential supporting application for full deployment of this system will be e-signature to facilitate authentication of online submission of tender documents. A step by step approach would be adopted. For example, once online payment is available, the features would also be incorporated in the system.

18. **Integrated National Planning, Budgeting and Monitoring System.** The system, being developed by the Planning Commission Secretariat and Department of Budget, is a web-based integrated national planning, budgeting and monitoring system, to be used for development management during the 10FYP.
19. **Online Polling on Policies.** The portal will provide features for citizens to provide feedback on the current government policies as well as polling on specific issues or policies under consideration.

Sectors are encouraged to identify applications which will help them in the delivery of their sectoral goals and mandates and which are not featured in the Guidelines. Such applications should be included in the 10th Plan.

The other aspect of ICT mainstreaming is in realignment of policies and programmes within the sectors to reflect the use of ICT. For example, with the establishment of Community Information Centres in every Gewog centre and expert information available on health, nutrition, agriculture in the sectors' websites, the role of the traditional extension workers in the field should change. This may be true in other sectors too.

Besides guiding sectors, Dzongkhags and Gewogs in mainstreaming ICTs into their respective 10FYP policies, plans, programmes and projects, the Guideline is designed to technically steer the formulation of an inclusive and holistic planning framework vis-à-vis the ICT sectoral objectives/targets and programmes/projects listed hereunder:

Sector Objectives/Targets	Programmes/Projects	Responsibilities / Implications
<i>Develop ICT infrastructure capable of delivering e-services down to the Gewog level</i>	Upgrade/Expand International Bandwidth	
	(SASEC) High capacity, low cost integrated data infrastructure: - Siliguri Exchange Hub - 4 x In-country Gateways - Cross-border links/enhanced backhaul capacity	SM/A, D, G (South Asia Subregional Economic Cooperation, SASEC: Members - India, Bangladesh, Nepal and Bhutan)
	Upgrade/Expand Nationwide Backbone Network	
	East-West Fiber Optic Network	SM/A, D
	National Broadband Master Plan	SM/A, D, G
	Strengthen/Enhance Broadcast Services	
	Expansion of TV transmission network	SM/A, D, G
	Expansion of FM transmission network	SM/A, D, G
	Expansion of radio broadcast stations	SM/A, D, G
	Satellite news gathering project	SM/A, D
Establish regional production houses	SM/A, D	

<i>Provide community-level access to basic ICT services</i>	Expand Last-mile Access Network	
	Expansion of rural telecom project	SM/A, D, G
	Expansion of mobile cellular network project	SM/A, D, G
	Establish ICT Centers	
	Expand Community Information Centers	SM/A, D, G
	Establish Regional ICT Centers	SM/A, D
<i>Promote ICT industry growth through public private partnerships</i>	Promote Public-Private Partnerships	
	Establish Contact/Call Centers	SM/A, D
	Establish Cyber Park	SM/A, D
	Establish ICT Center of Excellence	SM/A, D, G
	Create an ICT (industry) development fund	SM/A, D

Index: SM/A – Sectoral Ministry/Agency; D – Dzongkhag; G – Gewog.

The table above summarizes the ICT sector objectives/targets, proposed programmes and projects for the 10FYP and corresponding responsibilities and/or implications at different levels of governance.

A prerequisite for ensuring an equitable ICT infrastructure is investment: both public investment as well as complementary private investment. But the infrastructure thus created may not in itself be equally accessible. The 10FYP, therefore, emphasizes community-level access to basic ICT services such as telephony, Internet and media. Government initiatives to realize these are particularly important to narrow the widening urban-rural socio-economic gap.

Given the nature and the power of ICTs, the perception that they can be used as enabling devices in the effort to reduce poverty, realize the MDGs and maximize GNH is well-grounded and indisputable. As elaborated in the Guideline, ICTs can be used:

- for information collation and analysis;
- to serve as low cost means of communication and information dissemination;
- to enhance the productivity of operations varying from production and management to marketing and delivery;
- to help deliver services such as education and health more efficiently to even remote locations;
- to help monitor the status of achievement and progress on all development fronts;
- to help increase transparency and accountability in a range of organizations, including government; and
- to encourage networking at all levels of governance – Central, Dzongkhags and Gewogs – all of whom are working toward the same goals.

While ministries/agencies, Dzongkhags and Gewogs will be responsible for identifying specific ICT programmes and projects and keeping corresponding budgetary provisions, the MoIC will coordinate, monitor and technically backstop all ICT programmes in the country, to avoid duplication and hence the waste of our limited resources.