

*ICT4D Guyana
National Strategy
Final Draft
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All citizens, businesses and public institutions in Guyana will have the opportunity to participate in the information and knowledge society in order to accelerate national development and prosperity

The time to act is now!

Executive Summary

Guyana's National Information and Communication Technology (ICT) Strategy is a plan to facilitate and ensure the dramatic increase of our social and economic wealth at all levels: individual, organizational and national. The Strategy is geared to leverage and enhance Guyana's human resources, innovation, education, infrastructure and information technology to accelerate economic and social development. The Strategy is designed to play a critical role in achieving our National Developmental Goals and in facilitating and promoting our prosperity and well being.

The Strategy is grounded in the vision of all Guyanese having the opportunity to fully participate in the information and knowledge society in order to accelerate national development and prosperity.

There can be no doubt that ICT increasingly influence each and every sphere of activity today, including: economic, employment, social services, such as health and education, and cultural development. However, the "revolution of information" in Guyana has still not reached a great percentage of our population. Several factors account for this, mainly the lack of adequate infrastructure and a suitable enabling environment.

The Government recognizes that in order to accelerate the reduction of the digital divide in Guyana and to increase the accessibility levels to the Information Society, it is necessary to have a coordinated plan for effective development of ICT. The actions and activities should be realistic and flexible to local conditions and have the full support and institutional endorsement of the Government.

President Bharrat Jagdeo himself has directed the development and implementation of this Strategy and has appointed Mr. Robert Persaud, Information Liaison to the President to coordinate the effort. This Strategy is a broad and far-reaching effort that will provide tangible benefits for everyone within the country. It has been designed through a truly national process in a highly inclusive and transparent manner, involving active participation of hundreds of persons from the public and private sectors and civil society.

The first effort at crafting the Strategy were undertaken by a Group of ICT Professionals established under the chairmanship of Mr. Persaud. The Group was mandated to make submissions under relevant key thematic areas. Then on March 28, 2006, a National ICT Workshop was held to discuss the thematic areas. The result is this Strategy.

The overall objective of the Strategy is to accelerate economic growth and social development in Guyana. The specific objectives include:

- To promote the development of ICT services and businesses to increase job opportunities and generally to improve the economic and social well being of Guyanese.
- To improve the delivery of, and access by all citizens to Government and other public services, including information on government activities and opportunities, public health, education and social development services.
- To improve the competitiveness of existing Industries and to facilitate the sustainable development of new enterprises, thereby supporting economic diversification.
- To increase Guyana's international competitiveness in the delivery of goods and services to the global marketplace
- To develop pertinent, strategic and focused network infrastructure to enable access to information and knowledge.
- To support national programmes and initiatives which foster social cohesion.
- To ensure access to reliable ICT at the lowest sustainable cost so that all Guyanese have the opportunity of participating in the information and knowledge society.
- To create a new generation of citizens that can use ICTs to leapfrog Guyana's development.
- To develop and implement the necessary policies, laws and regulations that support the sustainable development of the ICT sector.
- To modernize Guyana's Public Administration, Industry, Commerce and Communications sectors.
- To support initiatives to encourage innovation and creation in the ICT sector.

The overall policy environment, the degree of transparency and inclusion, and, more specially, the regulatory environment, can all have a major impact on the development dynamic. In addition, the implementation of the key strategic actions identified under each of the thematic areas considered – human capacity, content and applications, infrastructure, enterprise – as well as policies supportive of fair competition, are important to harnessing the potential of ICT in Guyana and to achieving our development goals.

The ICT Strategy presents the results of the deliberations. The strategic objectives identified for each thematic area are as follows:

Capacity Building

1. Develop and implement policies to integrate ICT into the education and training system.
2. Develop and implement an effective scheme for skill retention.
3. Encourage partnership to facilitate effective knowledge management.
4. Develop programmes to strengthen human capacity of the broader society.

Development of Content and Applications

1. Encourage the development and dissemination of local content.
2. Promote the development and dissemination of local content
3. Improve the public's access to content
4. Develop and implement appropriate applications.
5. Encourage partnerships among community networks (public, private and citizens in diaspora) in order to facilitate bottom-up approaches and inclusiveness.
6. Develop and implement an e-government strategy.
7. Develop and implement programmes geared to enhance delivery of health, education, tourism, commerce, banking, environmental services etc. using ICT
8. Enhance Guyana's Disaster preparedness and mitigation capabilities through the application of ICT.

Infrastructure and connectivity

1. Promote ubiquitous access to information and knowledge
2. Promote access to reliable and advanced information infrastructure and internet access services at the lowest sustainable prices in all regions of Guyana.
3. Develop adequate infrastructure for Disaster Preparedness, Mitigation and Recovery.

Legislative and regulatory regime

1. Developing a legislative and regulatory framework to support a robust ICT infrastructure
2. Developing a legislative and regulatory framework to foster and support utilization of ICT

It enterprise development

1. Establish IT Parks with adequate, robust and redundant Infrastructure
2. Use of current IT technology platform for niche enterprises
3. Promote the development of software

The issue for Guyana is not whether it is worthwhile to make use of ICT, but rather how could ICT be used appropriately to meet the needs of the Guyanese people and achieve our development objectives. ICT has to be integrated into development as a catalyst for economic growth and social transformation. This Strategy presents the national plan to do just this.

1. Guyana's National Development Goals

Guyana's National Development Strategy (NDS) was developed, with the assistance of the Carter Centre, based on an initiative of the Government of Guyana in 1993 to use "home grown policies" to develop and exploit the country's huge natural resources to reduce the high poverty at the time. It benefited from the input of over 200 professionals from Government, the University of Guyana, the Private Sector, Non Governmental Organisations (NGOs) and Civil Society.

One of the chapters in the NDS is dedicated to dealing with information technology (IT). The NDS views IT as a significant enabling factor in improving a country's competitiveness and its social and economic growth. With globalisation on the increase, the NDS points out that the natural resources and low labour costs are no longer enough for countries to attain development. What it posits is that access to IT and knowledge is vital to tackle economic underdevelopment and inspire development. As such, the NDS recommends the appropriate investment and swift adaptation of IT, for social and economic development.

It also points out that the telecommunications infrastructure is the main impediment to the development of an efficient IT sector. The NDS envisages a huge role for IT in the development of Guyana. It recognizes that IT has a part to play in improving trade performance by improving the efficiency of transactions, increasing market scope (e-commerce) and reducing costs of services, etc. In addition to this, the NDS sees a major role for IT in public sector management (improving efficiency, transparency and accountability), agriculture, health and education sectors among others.

Guyana's Poverty Reduction Strategy (PRS) has its origin in the NDS and a Business Summit hosted by the Government of Guyana in 1999. The PRS is premised on seven pillars, namely:

- broad-based, job-generating economic growth;
- environmental protection;
- stronger institutions and better governance;
- investment in human capital, with emphasis on basic education and primary health; investment in physical capital, with emphasis on better and broader provision of safe water and sanitation services, farm-to-market roads, drainage and irrigation systems, and housing;
- improved safety nets; and
- special intervention programmes to address regional pockets of poverty.

In support of these pillars, the PRS identifies ICT as a pivotal tool to improve governance, accountability and transparency, generate employment – especially for women and youth, develop human resource potential, and strengthen national unity.

The PRS establishes three strategic objectives that the Government should address in order to leverage the opportunities of ICT, namely: (i) the initiation of communications reform; (ii) the provision of incentives for the development of informatics parks with a full complement of infrastructure; and (iii) the provision of training in Information Technology.

2. Achieving Development through ICT

“ICT and its diffusion in Guyana is so important and it has cross-cutting implications for all the sectors of our economy, that is to provide better services and boosting our productivity.... “

H.E. President Bharrat Jagdeo

National ICT Workshop 28th March 2006

Articles 14 and 15 of the Constitution of Guyana provide for the goal and objectives of economic development in Guyana. These include the objective of *“creating, promoting and encouraging an economic system capable of achieving and maintaining sustainable competitive advantage in the context of a global competitive environment”*.

The goal is additionally further realized through the objective of *“laying the material basis for the greatest possible satisfaction of the people’s growing material, cultural and intellectual requirements, as well as the dynamic stable development of their personality. Creativity, entrepreneurial skills, and cooperative relations in a plural society”*

Information and knowledge are critical not only to realizing the goals of economic development but also the overall goal of a better life of each Guyanese. Article 146 of the Constitution recognizes the importance of information, knowledge and the ability to disseminate and express that knowledge and information once acquired.

These goals, objectives and aspirations of creating a Guyanese economic and knowledge based society are closely aligned to regional, hemispheric and international trends and frameworks for the realization of the fullest potential of humanity.

2.1 Global/Regional Perspectives

The CARICOM Heads of Government, at their July 2002 Meeting in Georgetown, agreed that the Community would further pursue meaningful participation in policy-making towards the world information society. CARICOM recognized the potential of ICT for enhancing and integrating our societies in areas such as education, health, poverty reduction, delivery of public information and governance.

The CARICOM Connectivity Agenda, to which Guyana is a signatory, proposes that the three components essential to developing and regulating Internet usage and ICT are: Infrastructure, Utilization and Content. The thrust of this Agenda is for ICT to be used as an instrument for strengthened connectivity and development to foster greater prosperity and social transformation between and among Member States and the rest of the world.

The Latin America and Caribbean Regional Action Plan for the information society (e-LAC 2007), which was officially approved at the Regional Latin American and Caribbean Preparatory Ministerial Conference for the World Summit on Information Society, aims to move towards the establishment of an information society that will benefit all the inhabitants of Latin America and the Caribbean, and promote development through growth with equity, consolidating democracy and strengthening regional integration.

The declaration of principles of the World Summit on the Information Society (WSIS), held in Geneva on December 2003 reaffirms that "...Everyone, everywhere should have the opportunity to participate and no one should be excluded from the benefits the Information Society offers".

In November 2005, WSIS reaffirmed that "...in the quest to ensure that everyone can benefit from the opportunities that ICTs can offer, by recalling that governments, as well as private sector, civil society and the United Nations and other international organizations, should work together to: improve access to information and communication infrastructure and technologies as well as to information and knowledge; build capacity; increase confidence and security in the use of ICTs; create an enabling environment at all levels; develop and widen ICT applications; foster and respect cultural diversity cultural development of countries and the welfare of their people, in particular, in developing countries..."

3. The current state of ICT in Guyana

Guyana is, to a limited degree, already a member of the global information society. We currently deploy ICT, *albeit* in a limited *ad hoc* manner, in government, the private sector and in the production and in the delivery of some services.

A brief description of the current level of deployment of ICT in Guyana follows:

Government

The use of ICT by the Government is largely within the Financial Administration, Revenue and Public Information sectors. There are several other efforts to address various functions of Government; however these are undertaken as stand alone projects, in an *ad hoc* manner and do not benefit from standardized formats, sharing of experiences and/or infrastructure, etc.

Many Ministries have a presence on the Internet, though their functionality could be improved.

The Constitution and other laws of Guyana are online. An e-Commerce bill has been drafted and posted online for public consideration. A National Policy on Geographical Information System (GIS) was established in 2001.

Private sector

The Government offers incentives to businesses investing in the ICT sector such as call centres and software development. Several large companies have implemented enterprise systems and the banking sector offers some online transactions but not the full range.

Many retailers and authorized service centres of personal computers sell hardware and software, and a number of computer assembly stores have being established. Computer hardware is duty free. There are small numbers of Call Centres, Internet Service Providers, Web Hosting services and medical transcription services in different Regions of Guyana.

Education

There is a culture of distance education and many Guyanese are accessing online courses from outside of Guyana. The tertiary level educational institutions have not formally invested in the development of Guyanese online learning materials. One company in the private sector is developing the infrastructure for Guyanese online courses, while the Ministry of Education is delivering education using various ICT applications.

Health

Private hospitals have established relationships with medical personnel abroad to enhance the delivery of their services. The Public Health system utilizes HF (High Frequency) communications to serve remote communities.

Environment

The Environmental Protection Agency has a website that is utilized to keep the public informed of its activities and new developments.

DevNet is collaborating with other institutions in the Caribbean Region to launch a project to research the use of ICT in disaster management in Guyana.

Agriculture and land administration

Guysuco uses an Agriculture Management System (Field Reporting System) for managing sugar cane agriculture. GIS are in place at the Lands and Surveys Commission, the Forestry Commission, the Guyana Geology and Mines Commission and a few other organisations and private firms.

Other

There is a small but increasing Guyanese presence on the Internet. Local sites are developed with some individual initiatives for blogs, discussion groups on political and social content. There is no gender disparity in the use of ICT, though more males are involved in the technical aspects of maintaining the infrastructure.

The legal and regulatory framework for the ICT sector is slowly evolving. Many ICT projects are considered to have missed opportunities to innovate and re-engineer processes and the general uptake of cutting edge solutions such as GIS has not been as good as it could be.

4. Guyana's information infrastructure

The telecommunication infrastructure is largely owned and maintained by the Guyana Telephone and Telegraph Company (GT&T), which operates a Public Switched Telephone Network (PSTN) with a parallel fibre optic infrastructure to support frame relay services. Several remote villages are linked via satellite.

GT&T offers international connectivity via overland cable links through Suriname and French Guiana to the Americas II cable. However, both the overland cable links as well as the Americas II cable are subject to frequent cuts resulting in serious disruption of service. GT&T offers limited satellite redundancy for this connection.

Three companies provide cellular service, one being the dominant service provider. Other potential investors have shown strong interest in investing in this sector.

Internet is offered via a combination of Dial-up, DSL and wireless technologies. There are approximately 10 Internet service providers, who provide services both directly to end-users and through public venues. There are more than 200 Internet cafes all over the country.

Basic Data (telephone service):

Teledensity: 15% (land lines)

Landlines: 114,000 (February, 2005)

Cellular: 277,000 and growing

5. Guyana's Approach to harnessing ICT for social and economic advancement

On January 1, 2006 President Jagdeo, declared that "Information and communications technology offers tremendous promise. With liberalization of the telecommunications sector, information technology can make a significant contribution in improving communication, providing new and improved goods and services, as well as creating thousands of jobs for our young people. I would like to see telephones, computers and broadband access in every school and household in our country."

The Government well aware of the significance of ICT and its tremendous potential of achieving the goals of our National Development Strategy (NDS), the Poverty Reduction Strategy (PRS) and to the Millennium Development Goals (MDGs) has been working on the issue since 2001.

The Government recognizes the ICT sector to be both an important growth area for the national economy and well as a means of providing the services necessary for other sectors to achieve modernization, increased efficiency and productivity.

The Government recognizes also that in order to fully harness the benefits of ICT in pursuit of our national development goals it is necessary to craft and implement a coordinated strategy for the development of the sector. The Strategy should be realistic, flexible and adapted to the local conditions and have the support and institutional endorsement of the government.

The development of the ICT sector and the implementation of a feasible Strategy is passionately championed by President Jagdeo, who is committed to the full development of the sector.

The involvement of all stakeholders

The Government recognizes that the ICT vision and Strategy should focus on people and not just on technology. To give effect to this principle, President Jagdeo, in January, 2006, directed that an initiative be undertaken under the aegis of the Office of the President to craft, on a nationally inclusive basis, the National ICT4D Strategy.

For this purpose, Mr. Robert Persaud, Information Liaison to the President, was appointed as the ICT Strategy Coordinator. On February 3, 2006 the discussions on the ICT Strategy for Guyana commenced in the Boardroom at the Office of the President, when ICT professionals from all sectors started working of the

core elements of the Strategy. This Group of Professionals included: Gita Raghubir (Office of the Prime Minister), Vijayan E.K (Guysuco), John Persaud (GT&T), Valmikki Singh (NFMU), Gerald De Freitas (GT&T), Vidyaratha Kissoon (Devnet), Brian Yong (Broadband), Oliver Insanally (Guyana Net), Arun Mangar (New Technologies Ent.), Andrew Mancey (DevNet), Vijay Datadin (Red Spider), Shazaam Ally (Guyana Palace), Adrian Ally (GINA), Trevor Meredith (Computers & Controls Ltd.) and Fawwaz Baksh (NCN).

The Group of Professionals agreed to divide the work into different thematic areas: Infrastructure, Human Resources/Capacity Development, Legislation, Monopoly/Alternatives to connectivity, Applications, Management of the Information Communication Technology Sector, Internet Governance/Security, Disaster Preparedness, Universal Access, Software access and development, Government Policies/In-puts for growth, Industry Standards, Telecommunication Reform, and New specialised Growth Areas for Guyana. Five working groups were than set up to address these thematic areas.

The purpose of the working groups was to craft discussions documents that would constitute the basis for wider consultations with all stakeholders. As such, each working group commenced further work that took the form of a brainstorming and discussion process on the thematic areas. This process of interaction lasted until the end of February and resulted in written submissions proposing objectives and recommending strategic actions to be undertaken in relation to each thematic area.

In March 2006, the Office of the President arranged a National ICT Workshop that was designed to give every stakeholder an opportunity to craft the strategy. In preparation for this Workshop, the members of the Group of Professionals again met and prepared a "Discussion Document" that was presented to the Workshop.

The National ICT Workshop, hosted by the Office of the President, was held on March 28, 2006 at the Guyana International Conference Centre. 471 stakeholders participated in the Workshop. Participants were given most of the day to discuss the elements of, and to give input into, the design of the Strategy. The thematic areas considered at the Workshop were: Human capacity, Content and Applications, Infrastructure, Legal and Management, and IT enterprise.

President Jagdeo participated for the entire day, a definitive signal of his strong commitment and support for the development of the ICT sector. At the opening ceremony, President Jagdeo noted that, "You have a unique opportunity to help to craft a very important facility that could determine the future of this country and I urge you to make full use of this opportunity."

6. Defining the future

6.1 The National ICT Vision is that:

“All citizens, businesses and public institutions in Guyana will have the opportunity to participate in the information and knowledge society in order to accelerate national development and prosperity.”

6.2 The Overall Objective of the Strategy is:

To accelerate economic growth and social development in Guyana.

The specific objectives of the Strategy include:

- To promote the development of ICT services and businesses to increase job opportunities and generally to improve the economic and social well being of Guyanese.
- To improve the delivery of, and access by all citizens to Government and other public services, including information on government activities and opportunities, public health, education and social development services.
- To improve the competitiveness of existing Industries and to facilitate the sustainable development of new enterprises, thereby supporting economic diversification.
- To increase Guyana’s international competitiveness in the delivery of goods and services to the global marketplace
- To develop pertinent, strategic and focused network infrastructure to enable access to information and knowledge.
- To support national programmes and initiatives which foster social cohesion.
- To ensure access to reliable ICTs at the lowest sustainable prices so that all Guyanese have the opportunity of participating in the information and knowledge society.
- To create a new generation of citizens that can use ICTs to leapfrog Guyana’s development.
- To develop and implement the necessary policies, laws and regulations that support the sustainable development of the ICT sector.
- To modernize Guyana’s Public Administration, Industry, Commerce and Communications sectors.
- To support initiatives to encourage innovation and creation in the ICT sector.

7. Specific Strategic objectives and Actions

The strategic actions identified hereunder in relation to the following thematic areas - capacity building, content and applications, infrastructure, legislation and management and IT enterprise development - represent the consensus of Guyanese stakeholders.

7.1 Capacity Building

7.1.1 Concept

Human Capacity makes reference to the abilities and knowledge developed by a citizen that allows him/her to achieve a better human development.

7.1.2 Central weakness

Inadequate levels of relevant human capacity and training opportunities.

7.1.3 Strategic Objectives

- To develop and implement policies to integrate ICT into the education and training system.
- To develop and implement an effective scheme for skill retention.
- To encourage partnerships to facilitate effective knowledge management.
- To develop programmes to strengthen human capacity of the broader society.

7.1.4 Strategic actions

- 1) **To develop and implement strategies to integrate ICT into the education and training system**
 - a) Develop strategies for continuous ICT training for teachers at all levels and relevant to subjects
 - b) Adopt and adapt standardized ICT curricula across all training institutions
 - c) Promote the increment of learning opportunities by facilitating distance learning.
 - d) Promote the development of basic ICT skills workshops for all students. All primary, secondary and university graduates should be ICT literate
 - e) Include open-source in the ICT curriculum.

- f) Promote ICT-related courses at university/tertiary level and specific teaching in highly advanced areas, such as GIS, to better serve industry and expand the base of supportive certificate and diploma level at college level.
- g) Encourage and support the University of Guyana to enlarge the scope and depth of ICT in all areas of study.
- h) Create the establishment of specialized ICT centres in institutes of higher learning. Provision of affordable ICT equipment for public training institutions.
- i) Encourage the interconnection of schools, universities and research centres to national and international distance education facilities, national and international databases, libraries, research laboratories and computing facilities.
- j) Subscribe agreement with Partners in Learning Programme (Microsoft) to reduce the cost of licensing in the education sector.
- k) Promote linkages to other relevant international learning institutions

2) **To develop and implement an effective scheme for skills retention**

- a) Provide support to University of Guyana and other tertiary institutions to offer relevant ICT programmes responsive to the needs of the ICT sector.
- b) Facilitate the training of a critical mass of skilled ICT professionals and experts to sustain Guyana's use of ICTs for development.
- c) Create a national IT education centre.
- d) Develop special programmes for retention of local ICT talent and reduced skilled migration.
- e) Encourage the development of basic ICT skills workshops for all public sector personnel.
- f) Provide incentives to encourage the private sector to offer specialized training.
- g) Develop and approve a national standard for qualification, recognition and qualification equivalence for ICT professionals.
- h) Extend the scope of the para-statal research institutions such as Institute of Applied Science and Technology (IAST) to include innovations in the use of new ICT for particular sectors
- i) Encourage corporations to appreciate ICT competent staff and conduct ICT training for managerial and staff personnel.
- j) Encourage assessment and promotion of public sector personnel to include ICT competency.
- k) Ensure the equitable access of disadvantaged groups to ICT.
- l) Attract skilled ICT workers from abroad by offering benefits, ease of immigration, quick office set-up, and packages to facilitate participation.

- m) Encourage and support IT institutions providing national and international certification of IT.

3) **To Encourage partnership to facilitate effective knowledge management.**

- a) Encourage the partnership at community levels, religious organizations, and schools with the private sector and non-governmental organisations to provide attachment programmes for students and community.
- b) Encourage the private sector to persuade students, through media and career fairs, to appreciate and pursue ICT
- c) Encourage ICT research and development and partnership with the private sector and international educational/research centres.
- d) Encourage student placements in international ICT corporations.
- e) Provide research and development grants to competing research centres in identified specialized areas.
- f) Encourage the hosting of conferences, workshops and seminars on the latest technological issues and trends to ensure dialogue and engagement.
- g) Increase the awareness of ICT for all administrators and personnel in all sectors of the economy, including public administration; business; education; training; health; tourism; employment; environment; agriculture; and science.
- h) Encourage the systematic use of ICT in all sectors.

4) **To Develop programmes to strengthen human capacity of the broader society.**

- a) Develop community access points to support community development networks and localized training.
- b) Facilitate the development of special multimedia based training programmes, tailored to local community needs.
- c) Decentralize trade shows and ICT training centres.
- d) Promote the adoption of ICT among small, medium and micro enterprises (SMMEs).
- e) Encourage national excellence awards for ICT innovative solutions in selected categories of the economy and social development.
- f) Facilitate the issuance of software licences and provide tax incentives on innovative products targeted for development.
- g) Encourage acceptance of student placements within corporations and governmental agencies.

- h) Develop mechanisms and incentives to ensure technology and knowledge transfer.

7.2 Content and Applications

7.2.1 Concept

The two areas of Content and Applications make reference to the information that a country produces and processes by which information-based services are offered, allowing citizens to generate and exchange information and knowledge.

7.2.2 Central weakness

There is limited production of local content and few ICT applications serving Guyana.

7.2.3 Strategic Objectives

To ensure that ICT serves Guyanese society by enhancing the dissemination of information and the provision of services, facilitating informed discussion and creating a knowledgeable, vibrant people.

Content

- To encourage the development of local content.
- To promote the dissemination of local content
- To improve the public's access to content (in concert with the recommendations in Thematic Area 'Infrastructure and Connectivity')

Applications

- To develop and implement appropriate applications
- To encourage partnerships that would themselves engender novel applications and facilitate bottom-up approaches and inclusiveness
- To develop and implement a central and motivating e-government strategy.
- To promote the development and use of e-Commerce and e-Banking.
- To improve Guyana's disaster preparedness and mitigation capabilities through the application of ICT.

7.2.4 Strategic actions - Content

- 1) **To encourage the development of local content.**
 - a) Instruct decision makers in government agencies to actively provide information relating to their agencies/ ministries to other agencies and the public, through the use of ICT.
 - b) As one means of using ICT to provide information, Government agencies should utilise the Guyana Internet domain – i.e. establish .GOV.GY domain names.
 - c) Increase awareness among decision makers in the private and NGO sectors of the value and means of providing information relating to their agencies/ businesses to the public, through the use of ICT.
 - d) In concert with the recommendations in Thematic Area ‘Capacity Building: Human Resources/ Training’, encourage education programmes for young people in the production and management of content (literacy) at the tertiary education level.
 - e) Encourage publicly-funded events and initiatives to publish relevant information online.
 - f) Provide discretionary funds for content projects in government agencies in the short term
 - g) Incorporate ICT4D content-production and maintenance funding line-items into government budgets
 - h) Encourage public-private partnerships in content-production
 - i) Establish competitions for content generation by individuals, entrepreneurs, the private sector and NGOs
 - j) Preserve Guyana’s cultural heritage and make it more accessible to the public, particularly youths, and support tourism development in Guyana by:
 - i) Encouraging and supporting libraries, archives, galleries, museums and the National Trust to make information about their assets available using ICT, such as by providing online databases with electronic copies of rare manuscripts and views of artifacts, exhibits and historical locations.

- ii) Encouraging and supporting the Arts to make use of ICT, e.g. through the development of cultural CD, DVD and website products.
 - iii) Encouraging religious organisations to provide information using ICT
- k) Review Intellectual Property Rights (IPR) legislation with a view to encouraging development of content.

2) To promote the dissemination of local content

- a) Implement national-level website awards.
- b) Encourage the media to inform the public about content, content projects and sources of content (e.g. human interest/ magazine-type website reviews in newspapers)
- c) Instruct, where appropriate, clear promotion of and reference to online content resources in investment, trade, tourism and other publicly-funded promotions or events in and out of Guyana
- d) Encourage government sites to promote each other and other relevant websites, where appropriate. (e.g. the Ministry of Tourism, Industry and Commerce often provides prominent links on its Home Page to the websites of Go-Invest, the Guyana Marketing Corporation and St. George's Cathedral.

3) To improve the public's access to content (in concert with the recommendations in Thematic Area 'Infrastructure and Connectivity')

- a) Establish permanent and/or temporary access-centres/ kiosks, e.g. in public libraries, community centres, ministries, convention centres, at public events and in suitable public spaces, where the public can go to access content placed online.
- b) Encourage the establishment of cyber cafés/ telecentres by the private sector.
- c) Waive customs duty on all ICT hardware, software and supplies
- d) Offer special incentives for investment in ICT (e.g. for firms that want to develop software, ICT platforms and services).

- e) Encourage the Bureau of Statistics, the University of Guyana and other relevant agencies to monitor telecommunication prices, access-differentials and information-usage in urban and rural areas.

7.2.6 Strategic actions: Applications

1) To develop and implement appropriate applications

- a) Encourage decision makers and ICT personnel in government agencies and the private sector to seek new ways of disseminating and integrating digital content relating to their agencies/ministries
- b) Encourage ICT projects to consider process re-engineering, not simply process-replication, at the project formulation stage.
- c) Implement value-for-money audits of ICT projects and the reengineering process by the Audit Office of Guyana; and publication of findings
- d) Provide support to relevant institutions including, the Institute of Applied Science and Technology (IAST) to develop the infrastructure and services to support knowledge-sharing, particularly for the benefit of Guyana's educational, industrial and commercial sectors.
- e) Develop online databases in areas such as stocks of drugs and medical supplies and information on drugs, local human resources, availability of local facilities, local health care resources, government tenders and procurement, government jobs, consultancy opportunities and recruitment, etc.
- f) Develop Spatial Decision Support Systems (SDSS) to create a National Spatial Data Infrastructure (NSDI) and shift the decision-making and responses in health, public welfare, public infrastructure management (sea defences, roads, water and electricity utilities), crime, disaster preparedness and other expansive/ important issues towards data-driven bases.
- g) The recommendations of the approved National Policy on GIS provide a foundation for the NSDI and shall be implemented by government agencies. (See Appendix ** for the National Policy on GIS)
- h) The existing GIS systems at the Lands & Surveys Commission, Forestry Commission, Geology & Mines Commission,

Environmental Protection Agency, Sea Defences Unit, Iwokrama International Centre and in private firms provide a foundation for the NSDI.

- i) Develop e-learning platforms to increase the learning opportunities for Guyanese.

2) To encourage partnerships that would themselves engender novel applications and facilitate bottom-up approaches and inclusiveness

- a) Encourage a forum (e.g. a professional association) and dissemination of information that would help to make developers knowledgeable about standards, interoperability and other relevant considerations in ICT
- b) Encourage partnerships with community networks (including those in the Diaspora) in order to facilitate bottom-up approaches and inclusiveness.
- c) Encourage public-private partnerships in application development

3) To develop and implement a central and motivating e-government strategy.

- a) Elaborate an appropriate e-government strategy, which would:
 - i) Increase transparency, accountability and accessibility
 - ii) Eliminate duplication of efforts
 - iii) Support sharing of resources
 - iv) Provide for sustainability
 - v) Promote and facilitate innovation and development of content and applications at all governmental agencies
- b) Establish the government agency that would be responsible for coordinating and implementing the development and implementation of e-government.

4) To promote the development and use of e-Commerce

- a) Enable legislation to encourage the development of e-commerce and electronic payment.
- b) Encourage the development of 'virtual malls' showcasing storefronts and products (for domestic and international benefit).

5) To improve Guyana's disaster preparedness and mitigation capabilities through the application of ICT.

- a) Natural disasters have had a far reaching effect on the lives of Guyanese and the national economy, so ICT applications in Disaster Preparedness and Response efforts:
 - i) Are strongly encouraged
 - ii) Shall have direct funding for execution
- b) To provide early detection and warning of natural disasters, coordinated planning for and management of responses, and mitigation of their effects on Guyanese and Guyana, responsible national agencies will establish:
 - i) Monitoring facilities
 - ii) Reporting and early warning routes
 - iii) Spatial Decision Support Systems for planning and managing the response to natural disasters.
- c) To improve Guyana's disaster preparedness, and with a view to ensuring interoperability, efficiency and interagency coordination:
 - i) Responsible national agencies will put in place automated monitoring devices, with reliable track records.
 - ii) Responsible national agencies will put in place a reliable reporting and early warning network for point agencies
 - iii) Responsible national agencies will put in place a reliable notification network for early responders
 - iv) A national Spatial Decision Support System (SDSS) will be established to compile relevant data on a routine basis, conduct scenario-estimation and planning functions and actively manage disaster responses from pre- to post-disaster
 - v) Responsible national agencies will organize and implement a redundant emergency broadcast system for the public utilizing:
 - (1) Public radio channels
 - (2) Public and private television channels
 - (3) Mobile SMS channels
 - vi) Use of telecommunication frequencies/ bands will be deliberately, sensibly and openly harmonised with countries of the region

vii) The establishment of amateur radio will be encouraged by fiscal and other measures and a management agency appointed to encourage sustained and standards-based growth of the system

viii) Education/ dissemination of information on monitoring systems, responsible agencies and their roles and preparatory advice to the public will be actively and routinely done via:

(1) The print, radio and television media

(2) The primary, secondary and tertiary education systems

(3) An Internet portal

d) To build redundancy and increase the probability of useful information flows and responses during and post-disaster, citizens will be encouraged to equip themselves with well-known, alternative means of communication

e) To leverage the combined analytical, planning and research resources of the global academic and professional communities, data and information generated by monitoring systems shall be suitably formatted and made publicly available via a web portal.

7.3 Infrastructure and connectivity

7.3.1 Concept

Infrastructure and connectivity make reference to the necessary tools that any citizen needs in order to access the information and knowledge society.

7.3.2 Central weakness

Inadequate and unreliable infrastructure for the development, generation, and reception of information and knowledge. Low penetration levels of Internet access services and other value added services provided to the general public and to schools and other public institutions.

7.3.3 Strategic Objectives

- To promote ubiquitous access to information and knowledge
- To promote access to reliable and advanced information infrastructure and Internet access services at the lowest sustainable prices in all regions of Guyana.
- To develop adequate infrastructure for Disaster preparedness, mitigation and recovery.

7.3.4 Strategic Actions

- 1) **To promote ubiquitous access to information and knowledge**
 - a) Promote access to reliable and advanced telecommunications (information) infrastructure and services at the lowest sustainable prices in all regions of Guyana
 - b) Encourage the development of strategically focused telecommunications networks.
 - c) Prioritize national-level initiatives to capitalize on infrastructure.
 - d) Monitor the development of the national information infrastructure grid.
 - e) Establish regional and domestic communication hubs.
 - f) Support harmonization and standardization of relevant regional legislation and regulations.
 - g) Restructure and re-scope the licence issued to Guyana Telephone and Telegraph Co. Ltd.
 - h) Invest in redundancy for the national and international Internet Backbone
 - i) Ensure the provision of adequate and redundant Internet bandwidth

- j) Pursue one laptop per child (OLPC) US\$100; lobby for Guyana to be given priority.
 - k) Implement programmes such as the Canadian “Computer for Schools Programme”
- 2) **To promote access to reliable and advanced information infrastructure and Internet access services at the lowest sustainable prices in all regions of Guyana.**
- a) Promote the competitive provision of Internet access services in order to bridge the Digital Divide
 - b) Promote the development of community telecentres in unserved or underserved areas to ensure last mile connectivity.
 - c) Encourage the development of pilot projects with innovative technologies.
 - d) Explore partnerships with the private sector and encourage telecommunications companies to explore/expand into rural areas.
 - e) Establish partnerships with NGOs engaged in projects aimed at increasing ICT awareness and projects that apply ICT innovation.
 - f) Increase coordination of donor funds and information flow among donors.
 - g) Encourage where appropriate infrastructure sharing.
 - h) Encourage the creation of a National Internet Exchange
 - i) Encourage the establishment of Payment Gateways
 - j) Research the benefits of wireless technology and its applications as a means of addressing the high prices of personal computers and inadequate levels of connectivity
 - k) Encourage the provision of stable and reliable power supply
 - l) Encourage the provision of clean power
 - m) Promote research in the electricity sector in order to explore alternative supply methods and sources of energy so as to reduce costs.
 - n) Encourage the increment of bandwidth, higher availability and higher penetration.
 - o) Encourage the development of appropriate “last mile” initiatives or projects for the deployment of Internet and Universal Access.

- 3) **To develop adequate infrastructure for Disaster Preparedness, Mitigation and Recovery. (in conjunction with thematic area “content and applications”)**
 - a) Plan and establish a redundant, emergency broadcast system to warn point agencies, early responders and the public, in an appropriate manner.
 - b) Build redundancy and increase the probability of useful information flows and responses during and post disaster, citizens will be encouraged to equip themselves with well-known, alternative means of communication.

7.4 Legislative and Regulatory Regime

7.4.1 Concept

This section refers to the legislative and regulatory regime necessary for fostering and regulating the free flow of, and access to, information and knowledge.

7.4.2 Central weakness

Inadequate legislative and regulatory regime to support the growth and development of the ICT sector.

7.4.3 Strategic Objectives

- To develop and implement a legislative and regulatory framework to support a robust ICT infrastructure
- To develop and implement a legislative and regulatory framework to foster and support utilization of ICT

7.4.4 General Principles

It is recognised that the development of the appropriate legislative and regulatory regime for the sector must be premised on the following general governing principles:

- ❖ Priority must be given to the development of legislative and regulatory framework
- ❖ The legislative and regulatory framework must be not be static, it must evolve to meet the needs of this dynamic sector
- ❖ The framework must be developed and implemented with the recognition that there is increasing convergence of the means of providing ICT
- ❖ There should be a holistic approach to the development of the legislative and regulatory framework given the crosscutting and multi faceted nature of the sector .
- ❖ Harmonization of ICT related laws and regulations should be pursued particularly within the context of CARICOM (CSME and the revised Treaty of Chaguramas), UNCITRAL, ITU and WSIS; and international best practices should also guide development and implementation of the framework
- ❖ As far as possible, self regulation should be encouraged grounded in the recognition that responsibility for the orderly and sustainable

development of the sector rests with all stakeholders in all spheres of activity.

- ❖ Regulation must be premised on the concept of “technological neutrality” so as to provide the flexibility to facilitate technological and innovative dynamism in provision of services and deployment of ICT.
- ❖ The process of developing and implementing the legislative and regulatory framework must be one that inspires public confidence and trust and as such must be grounded in the principles of:
 - transparency,
 - inclusiveness of all stakeholders,
 - equity
 - certainty and predictability
- ❖ The framework must provide security to stakeholders.

7.4.5 Strategic actions

1) To develop a legislative and regulatory framework to support a robust ICT infrastructure

Development of the Internet and ICTs is highly dependent on the availability and quality of telecommunications infrastructure (or “information” infrastructure as it is increasingly referred to). Efficient ICT applications in general and particularly, efficient e-commerce markets require reasonably priced access to reliable high-speed telecommunications services and facilities. It is evident that lack of such infrastructure has retarded ICT development in many countries.

It is recognized that the requisite legislative and regulatory framework for governing the national information infrastructure must comprise a mix of telecommunications laws and regulations, radio communication (frequency spectrum licensing and management) laws and competition laws.

1. A new Telecommunications or Information and Communications Technology Act will be tabled for enactment to replace the Telecommunications Act, 1990 (No. 27 of 1990). The new Act will establish the framework for fostering the growth and development and regulation of the national information infrastructure and will provide the main rules for activities in the sector; these will include promotion of competition at all levels as effective competition has proven to be essential for increasing efficiency and lowering costs. This new law will be consistent with international norms.

2. Regulations will be promulgated to prescribe the detailed rules for activities in the sector. The major regulations will be as follows:
 - ❖ Authorisation (including licensing) Regulations– clarity, predictability being the principal elements thereof.
 - ❖ Interconnection Regulations – will provide for interconnection of all facilities-based operators in order to allow efficient communications between subscribers of all networks on a seamless basis.
 - ❖ Radiocommunication Regulations will establish rules for management of the frequency spectrum, allocation of frequency bands and licensing of spectrum users with a view to ensuring the optimization of the frequency spectrum.
 - ❖ Universal access regulations will set rules for expansion of access to telecommunications and Internet information services by all citizens of Guyana, including the establishment of the new Universal Access Fund.
 - ❖ Competition Laws and Regulations will establish the fair trading principles to prohibit anti-competitive conduct, such as predatory pricing, unlawful cross-subsidization and horizontal agreements on pricing.
 - ❖ Price regulations will allow for deregulation of prices for services in effectively competitive markets and possibly for the establishment of price caps and floors for certain key services such as public voice telephone services and leased lines.
 - ❖ Consumer protection regulations will establish the basic rules for relation between providers of public telecommunications services and their consumers and will relate to payment of bills, disconnection of services, notices regarding rates and rate changes, etc.

2) To develop a legislative and regulatory framework to foster and support utilization of ICT

1. Develop, approve and table for enactment the necessary legislation for e-Commerce

It is recognised that the legal infrastructure is as important as the physical infrastructure in order to fully enable ICT utilization and applications, including e-commerce. Some of the issues that are viewed as critical for the development and regulation of e-commerce include the legal authorization of digital signatures and the enforcement of digital transactions. A draft e-Commerce Bill has been prepared and circulated for public comment. This draft Bill provides, *inter alia*, for:

- ❖ the legal recognition of digital signatures,
- ❖ the legal recognition of electronic records,
- ❖ the formation of contracts electronically e.g. by exchange of e-mails,
- ❖ the electronic delivery of legal documents,
- ❖ the production in evidence of an electronic version of an original document,
- ❖ the retention and inspection of original legal documents in electronic format ,
- ❖ rules relating to attributing an electronic record to the originator,
- ❖ rules dealing with the validity of acknowledgments of electronic messages, the time at which the message is sent and received and the place at which it is received,
- ❖ the establishment of a code of conduct in relation to e-commerce service providers and intermediaries,
- ❖ the establishment of an e-Commerce Advisory Board,
- ❖ the making of regulations regarding data protection,
- ❖ the making of regulations regarding administration of the country code top level domain name,

The e-Commerce Bill will be finalized and tabled for enactment.

2. Amendment of current laws

Existing laws and regulations will be examined to determine whether amendments thereto are required for the application of such laws to Internet usage and ICT applications and if required, the necessary amendments will be made:

These include:

- ❖ Tax laws – including income tax, corporate tax, value added tax, withholding tax, etc. for applicability to transactions of business over networks.
- ❖ Sales of Goods Act for liability for defective or injurious products sold via the Internet.
- ❖ Public order laws, including, gambling, and lotteries for applicability to such on line activities.
- ❖ Customs Act for applicability to goods and services delivered electronically,
- ❖ Insurance Act,
- ❖ Securities Act for applicability to on line discussion and trading in securities;

- ❖ Regulated professions, medicine, law, accounting engineering for applicability to recognition of on line training and electronic certification.
- ❖ Evidence Act
- ❖ Banking Act
- ❖ National security Laws for applicability to on line terrorist activities and bomb making instructions.
- ❖ Criminal Law (offences) Act and Summary Jurisdiction (Offences) Act
- ❖ Defamation laws to address defamatory statements expressed on-line.
- ❖ Intellectual Property Rights laws

3. New laws and regulations

New laws and regulations will be enacted to address other issues including the following:

- ❖ **Privacy and data protection** – including security of the Internet and protection of individual's rights to the privacy of their personal information are key measures for building public trust in utilizing the Internet and ICT. New legislation must address these issues as well as regulate unsolicited commercial messages by e-mail, restrictions on selling mailing lists or using credit card transaction data. Such laws will also address children's privacy protection (particularly with respect to pornography and violence), and regulation of a web site operator's collection, unauthorized use and disclosure of personal information.
- ❖ **Electronic crime** – (any crime that in some way or other involves the use of ICT) will address, inter alia, computer related fraud and forgery, child pornography, copyright infringements, unauthorized access, unauthorized modification of data, unauthorized impairment of electronic communication.
- ❖ **Information Law** – explore and if feasible enact an access to information Law.
- ❖ **ISP Liability**
- ❖ **Domain Names**
- ❖ **Technology Transfer**
- ❖ **Online Dispute Resolution**

Efforts will also be made to:

- Develop the necessary legislative support to enable contracts for services over distances, to protect local companies and assure their fulfillment

- Explore the use of Free and Open Source Software (FOSS)
- Engage in technology transfer blueprints in partnership with foreign corporations and research centres
- Encourage the development of suitable restrictions on ICT access technologies that facilitate cyber crime and compromise national security
- Establish standards for performance in the ICT sector
- Provide support to the Guyana national bureau of standards to incorporate the relevant standards into their repertoire of standards

7.5 IT enterprise development

7.5.1 Concept

IT Enterprise Development makes reference to the opportunity that a country has to develop a new industry based on information and knowledge

7.5.2 Central weakness

Inadequate infrastructure, human capacity and legislation to promote the development of ICT enterprises.

7.5.3 Strategic Objectives

- ❖ To establish IT Parks with adequate, robust and redundant Infrastructure
- ❖ To encourage the use of current IT technology platform for niche enterprises
- ❖ To promote the development of software

7.5.4 Strategic Actions

- 1) **To establish IT Parks with adequate, robust and redundant Infrastructure**
 - a) Identify areas above sea level for IT Parks.
 - b) Approve concessions for export industries in IT parks to boost export of technology base.
 - c) Create suitable structures and ensure full transfer of information.
 - d) Promote the IT Park abroad and declare them as special zones with privileges (labour and taxes).
 - e) Establish housing schemes, schools etc. close to IT Parks.
 - f) Establish a special program aimed at retaining local ICT talent and reducing skilled migration. Re- attraction of migrated talent/ their continued utilization as remote resources are also recommended.
 - g) Encourage IT Firms to establish presence in Guyana with a view to boosting technology transfer.
 - h) Expand incentives for IT activities so as to enhance the investment climate
 - i) Develop and execute appropriate marketing strategy for Guyana's IT enterprise potentials
 - j) Attract second and third level expertise and overseas skilled personnel to Guyana with suitable measures.

2) **To encourage the use of current IT technology platform for niche enterprises**

- a) Encourage the establishment of an ICT Chamber.
- b) Review ICT incentives.
- c) Develop a workshop to advise ICT professionals on raising capital and preparing business cases; linking them with venture capitalists with significant liquidity
- d) Encourage Guyana's Foreign Missions to aggressively market Guyana's ICT potential.
- e) Explore the possibility of implementing special tax regimes for ICT University Graduates
- f) Encourage regular Guyanese presence at relevant ICT fairs and conferences.

3) **To promote the development of software**

- a) National agencies should strive to purchase only hardware that meets internationally accepted standards.
- b) National agencies and the ICT education sector should strongly consider appropriate Open Source solutions
- c) The University of Guyana must enlarge the scope and depth of its Computer Science programme and aim to become a Caribbean Centre of Excellence.
- d) Government should establish server farms for its own use and possible other Caricom Governments.
- e) Harness the Diaspora - Grant "Premium" Duty Free concessions for repatriate ICT Professionals

7.6 Implementation and management

The national ICT4D agenda will set forth a plan of action and timetable for implementation of policies and the National ICT4D strategy. In order to achieve success in the implementation of the agenda the following three key factors are critical:

1. Sustained Government Commitment and support
2. Establishment and operationalizing of an appropriate structure for implementing the strategy and for managing the sector.
3. Finance and sustainability

1. Government Commitment

H.E. President Bharrat Jagdeo in his 2006 New Year's address to the nation, declared that an ICT Strategy will be launched as part of his vision of building a modern Guyana. He stated "...I would like to see in the next five years, 80 per cent of all Guyanese having access to the Internet. .. Information Technology will also in the next few years, dramatically transform the way education is delivered. We intend to ensure that through the use of broadband technology, all our schools will have access to the Internet and thus able to connect to an expanded range of educational resources and from an early age expose our children to the expansive, exciting world of cyberspace. We also intend to train teachers who are versed in the use of these modern tools of learning."

The President has committed to facilitating the implementation of the Strategy and the ongoing development of the sector through his office, the very highest office in Guyana.

2. Management Structure

Given the recognition of the importance of ICT deployment to the economic and social development of Guyana and given also that deployment of ICT is multi faceted and cuts across many sectors of the economy, the task of managing Guyana's transition to an information and knowledge society will be assumed by the highest office in Guyana, the Office of the President.

An ICT Unit (ICTU) will be established within the Office of the President. The head of that Unit will have authority equivalent to that of a Minister of

the Government. The Unit will be vested with responsibility for overall finalization of this Strategy and preparation of the Plan of Action to implement the Strategy. The Unit will also keep the sector under review, and will be responsible for revising policy as needed and, on an inclusive basis, developing and implementing new strategies.

Legislation will be developed and tabled for enactment, to provide for the establishment of an ICT Authority (ICTA). This will be a largely autonomous body charged with the responsibility for regulating the telecommunications and ICT sectors. The Public Utilities Commission (PUC) will function as a Competitions Commission for sector specific issues.

The ICTU will benefit from the guidance and advice of an ICT Advisory Panel comprising representatives from the public and private sectors and civil society. This Panel will address issues concerning the sector including ICT audits, monitoring, evaluation and market entry.

The responsibilities of the National ICTU should be to manage central facilities of the ICT sector including a National Internet Exchange, Payment Gateway Systems, administration of the country code top level domain name - .GY , and ICT Parks.

Activities and responsibilities of the ICTU and the ICT Advisory Panel will include:

- ❖ Maintaining an inventory of all ICT resources- including skills, hardware, software, communication technologies and protocols so that more informed decisions can be taken. Duplicity of efforts can be reduced and synergy between similar projects can be realized.
- ❖ Linking Guyana with the rest of the world to facilitate the flow of new technologies in both directions and the exporting intellectual products and services.
- ❖ Establishing knowledge sharing infrastructure between research institutions and operators in the different sectors: - e.g. NARI, EPA with GUYSUACO and other agricultural producers; Geology & Mines Commission with miners; Guyana Forestry Commission with forest producers;
- ❖ Establishing a research policy unit to determine international trends.
- ❖ Developing a detailed action plan, time schedule, priorities and budget.
- ❖ Formulating a public awareness campaign.

With respect to the regulatory institutions to be established, a model will be adopted that distributes policy-making and regulatory responsibility among the ICTU, the ICTA and the PUC.

The market, including business users, consumers and competitors, will play the leading role in determining the choices, prices and quality of telecommunications services. However, the regulatory institutions will perform important roles to establish the ground rules for the development of an efficient market and, by enforcing those rules, to ensure fair play in the market, as between suppliers, and between suppliers and consumers.

3. Finance and sustainability

The ICTU will need to develop and maintain several activities in order to assure the implementation of this strategy.

Some primary sources of income will be:

- ❖ Sale of .gy domain
- ❖ Fees for the use of the Internet Exchange
- ❖ Fees of the Payment Gateway
- ❖ Fees of utilization of the ICT Parks

Other financing mechanisms will be developed to sustain the implementation of the strategy, including:

- a. Establishing a Universal Access Fund (UAF). Main revenues of the UAF should come from licensed service providers. Additional revenues will be sought from other sources, particularly international financial institutions and donor organizations.
- b. Providing access to funding and credit financing by:
 - Encouraging foreign and domestic venture capital funds.
 - Establishing micro-finance opportunities via domestic industrial or development banks.
 - Exploring partnership possibilities with the private sector in establishing critical infrastructure.

