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USAF CAPACITY BUIDLING MODULE: DATA COLLECTION AND MARKET ANALYSIS

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Introduction

This is Capacity Building Module #4 of the USAID/GBI program to support enhancement of Universal Service and Access Funds (USAFs) as a resource to promote ICT development. This module addresses USAF Data Collection and Market Analysis. Other modules in this series address the following topics:

Module #1: USAF Strategic Planning

Module #2: USAF Program Concepts

Module #3: USAF Monitoring and Evaluation

Collectively, these modules offer a set of useful information resources and practical tools, based upon international experience and best practices, in the management of Universal Service and Access Funds. Combined with other capacity building resources, including direct technical assistance from GBI and others, these modules can help USAF administrations and staff to enhance Fund operations, and improve the effectiveness of ICT development financing on many levels.

Module Objectives, Contents

This module presents information, examples, and recommended methods for the data collection and market analysis responsibilities of USAF administrations, in support of their program and project development and evaluation functions. The highlighted practices and ideas are based upon the experiences of many successful USAF organizations, as well as the expertise of GBI's technical assistance team. While every Fund will have its own unique needs and approaches, the concepts presented in this Module should be of use to any USAF seeking to establish and upgrade its information gathering and analytical capabilities.

The Module consists of the following components:

1. DATA COLLECTION OBJECTIVES AND METHODS: Recommended objectives and methods for USAF administrations to consider in developing their internal data collection and database management functions.

2. USAF MARKET ANALYSIS: Examples of key approaches to ICT market analysis in support of development of USAF goals, programs, and projects.

I. Data Collection Objectives and Methods

1.1 Objectives of USAF Data Collection

The goal of ICT market data collection and database functions for a USAF is to establish a permanent, robust, and evolving capability to monitor and evaluate the impact of the Fund's activities in support of the ICT sector, and the overall growth and impact of that sector. Upon full implementation of an effective database system, a USAF should be able to:

- Obtain up-to-date and real-time data on all telecommunications networks and services in the country, with particular focus on rural and under-served areas, including network coverage, service usage, costs and pricing, and other key operating information;

- Maintain thorough records of all USAF financial information (linked to Accounting functions), including contributions received from and payments made to telecommunications enterprises, etc.;

- Help verify telecommunications operators' compliance with the conditions of USAF subsidy support, in terms of network construction and service delivery obligations;

- Identify locations where service coverage is unavailable or inadequate, to assist in defining priority USAF subsidy allocations;

- Evaluate the effectiveness of USAF financial support in increasing access to telecommunications, including unit costs, timing of deployments, and magnitude of service take-up;

- Conduct studies of the impact of USAF-supported telecommunications investments upon local populations and rural economies.

These programs will necessarily be implemented in stages, and adapted to changing conditions and capabilities over time. Ideally they should become an increasingly central and visible aspect of the Fund's operations. The more accurate and informative the data gathering process, the better the USAF will be able to respond to evolving needs of rural communities, and to advise the Government on revisions to their ICT development policies.

1.2 Key Components of Data Collection Functions

The key components required to establish an effective data collection and database management function within a USAF include the following:

- SPECIFICATION OF DATA REQUIREMENTS: Identification of the nature and type of information to be collected.
- DESIGNATION OF PERSONNEL ROLES, RESPONSIBILITIES: Assignment of appropriate levels of functional and management responsibility.
- ESTABLISHMENT OF DATABASE: Procurement and setup of the formal database.
- IDENTIFICATION OF DATA SOURCES (PRIMARY, SECONDARY): Identification of the various sources from which data will be collected.
- DATA COLLECTION FUNCTIONS, PROCEDURES: Development of the formal, detailed tasks required to obtain necessary data inputs.
- DATABASE OUTPUTS, REPORTS: Definition of the scope of information to be reported from the database.

The following sections of this Module elaborate upon each of these key components.

1.3 Specification of Data Requirements

The standard data inputs to be collected on a regular basis regarding national ICT sector status should include any indicators of sector performance and Fund activity that are mandated by the Fund's own legal obligations and formal objectives, including the forecasts contained within the Fund's strategic plan, and any standards included within individual Fund supported projects.

All data requirements can be organized according to three categories: (a) general administrative, geographic, and demographic; (b) telecommunications networks and services, including usage data; and (c) financial data.

Ideally, information will be provided on the most micro-level possible, e.g., for each individual town or village within a province or district; where such detail is not available, higher-level averages and aggregation may be necessary. For certain data, such as financial contributions to the USAF, inputs should be separated for each licensed contributor.

Note that there will be numerous cross-sections and sub-categories within the actual database required to capture all necessary data, and to measure and tabulate results. The listings here represent the main classifications, but not necessarily all data points that must be obtained.

a) Administrative, Geographic, Demographic Data

This information covers the baseline market conditions in which the Fund's activities and ICT sector performance will be evaluated. These details are important to understand the context and impacts of Fund projects.

- Name and administrative location of all towns, villages in all designated under-served areas
    - Geographic coordinates (GIS)
    - Population (persons, households, age and gender data)
    - Geographic size (sq. km)
    - Topographic conditions: mountain, jungle, island, etc.

- Local economic data
    - Household income distributions
    - Local business activity (enterprises, industries, shops, farming, etc.)
    - Employment/unemployment, by sector; also male/female and age
    - Tax receipts, Government expenditures

- Institutional, infrastructure data
    - Schools, students, teachers
    - Health clinics, doctors, nurses
    - Local government offices, # of personnel
    - NGOs and other local institutions
    - Public community centers, libraries, post offices
    - Roads, electricity, water

b) Telecommunications Network and Service Data

These inputs should cover all relevant telecommunications deployments that are of concern to the USAF's mandate.

- Fixed telephone network, services
    - Network coverage (towns with/without access)
    - # of access lines: residential business, government, public phones
    - # and minutes of calls: local, long distance, international (outgoing, incoming)
    - Availability of "compulsory" basic services (emergency, directory, etc.)

- Mobile telephone network, services
    - Networks' signal coverage (2G, 3G), by geography and population
    - # of SIM cards, by enterprise and location

  - # and minutes of calls: local, long distance, international (outgoing, incoming)

- Internet access, services
  - Public access telecenters and Internet cafés: location, services, bandwidth, utilization
  - Private access and usage of Internet connections

- Other ICT access
  - Broadcast radio, television
  - Satellite network facilities
  - Wireless access: Wifi, WiMax, other

c) Financial Data

The Fund's Accounting staff will be responsible to collect appropriate financial data as part of normal operations. Most of this data should be input to the main operating database, to allow cross-referencing and analysis of financial information with the other database parameters.

- Industry revenue data, by operator, service, and locations
- Contributions to the Fund from each type of service and enterprise
- Amount of subsidy payments for each USAF funded project, by location and type of service
- Other general accounting data for the Fund

1.4 Designation of personnel roles, responsibilities

The specific assignment of official USAF personnel staff roles and responsibilities in relation to the data collection and database management functions will vary depending upon the size and resources of the Fund, and its access to potential other support. In general, the following positions are required:

- Director and Assistant Director of Data Collection and Market Analysis: At least one management-level official should be assigned senior responsibility for overseeing establishment and operation of the data collection, database, and market analysis functions. The senior Director might be a part-time role, with daily management functions under an Assistant Director, or there might only be a full-time Director.

- Statistician, Data Analyst: One or more technical staff with high-level expertise in managing and understanding complex statistical models and databases. This position should report directly to the Director, and should work closely with all relevant technical personnel.

- Software Engineer: This role is responsible for setting up and managing the internal workings of the USAF database software, typically working in collaboration with the private vendor of the system. A person with database programming and LAN/WAN management capabilities should be assigned this role.

- Local Liaison Officials: There should be designated personnel within each major geographic region who are responsible for assisting with data collection, surveys, and other localized research. Some Funds may have satellite offices in different regions where such functions can be assigned from among available staff. In other cases, the Fund may develop relationships with local Government officials, or part-time local consultants, depending on the scope and frequency of needed local support.

Note that these do not all necessarily need to be full-time positions, as some of the functions can effectively be shared among other internal USAF responsibilities that call for the same skills. For example, Data Analysts should also be involved with USAF project design and evaluation functions, and Software Engineers can be responsible for managing all internal USAF information technology needs. Also, some of these functions may be outsourced, especially the early database creation and installation tasks, which will likely be handled by an outside vendor.

1.5 Establishment of Database

A formal, comprehensive database system should be established within the USAF administration to store and manage the data collected on Fund activities and ICT sector status. The following represent the general steps required to establish this database. Specific details of the process will ultimately be dictated by the response of vendors and the Fund administration's internal resources.

a) System procurement, installation

- Develop preliminary specifications, Requests for Information from vendors
- Review vendor materials, inputs, prepare initial draft system specifications, RFP
- Solicit vendor preliminary bids; clarify, revise RFP as necessary
- Select system vendor(s), establish contract terms, timetables for delivery, installation, training
- Hardware, software installation of main database/warehouse system
- Testing, training (together with vendor(s))
- System launch

b) Database and input module design

- Define detailed data needs
- Develop internal database matrix structure for data storage
- Develop input formats, interface to main database
- Develop supporting user interface for remote user data inputs
- Test, validate Input Module with internal database storage structure
- Review, revise formats, structure

c) Hardware and software requirements

Note: equipment and software already in use within the USAF or at remote offices may be adapted to incorporate and/or link to the database system. This should only be done if there is adequate capacity and if all systems are up-to-date and well maintained.

- Servers: Data "Warehouse" and Application Servers: 1 apiece plus 1 backup
- Personal Computers (clients): At least 4 workstations within the USAF headquarters; 1 workstation per remote location
- LAN/WAN networking facilities (Ethernet, router, etc.)
- Standardized commercial database software package (including installation, training, customization as needed)
- Local data input-output module programs (user interface)
- Spreadsheet and word processing applications, customized to link to database inputs/outputs
- LAN/WAN software platforms

1.6 Identification of Data Sources

The sources from which the data required for the USAF database and market analyses should be obtained will vary for each country. In many cases, the existing Regulatory Authority should have established relationships with licensed telecom operators that require them to provide much of the basic network and usage data, but in numerous countries such information flows are not well maintained. Where possible, the USAF should rely upon such existing sources, but it should be prepared to create its own channels of data inputs where necessary.

In general, there are two sources of potential information: primary sources that directly collect the data needed, and secondary sources that provide complementary or indirect information necessary to the data analysis. These are summarized below.

Primary data sources

- USAF project monitoring reports: Each project funded by the USAF should generate regular monitoring reports, with detailed data on deployments, finances, users, and other factors, which implementing operators should be obligated to provide in standardized formats.

- Telecom operator network, usage, financial data: Beyond USAF projects, the Fund administration should obtain access to all available statistical information from licensed telecom operators in the country. Reporting of such data should ideally be an obligation of all licensees under the authority of the National Regulator. If such data are not regularly collected, it will be important to develop formal reporting rules, and to encourage adoption of appropriate regulations if necessary.

- Local surveys: In many cases, surveys of local areas within rural and under-served regions can be conducted under the auspices of the USAF administration to augment whatever data is available from other sources. Such surveys can target specific locations where detailed market information is not readily available, especially where new projects are being considered. Each survey in a given region should conform to a standardized set of questions and outputs, to allow the central USAF database to collate and evaluate conditions across rural regions.

- Other inputs from local officials: The Fund administration should maintain regular contacts with local officials throughout the country, whether from its own satellite offices or through other, informal connections. These relationships should allow Fund personnel to request local information in an expedited manner, and to reinforce other research with up-to-date and authenticated local sources.

Secondary data sources

- National census, economic, demographic reports: Many national statistical agencies collect information on telephone and computer use, Internet connections, and other relevant consumer and business activities. In addition, national census and economic reports are usually the most reliable source of basic economic and demographic data. The Fund's management can work with such agencies to specify indicators that they would like to see included, while incorporating outputs of such reports in the Fund's database.

- Previous studies, surveys: All studies and surveys of the ICT sector that have been conducted by the Regulator, Ministry, private firms, and others, should be reviewed and added to the USAF library. Past data can be used to verify trends and evaluate longer-term impacts of Fund activities.

- GIS databases, maps: The Fund's database functions should incorporate geographic disaggregation and precision as much as possible. Ideally, all findings and outputs should be measured within Geographic Information System parameters, to allow for a range of cross-tabulation and comparisons. Where such GIS systems and maps have been created for the country, they should be adapted for the Fund's statistical needs.

1.7 Data Collection Functions, Procedures

The data collection functions of the USAF administration should consist of several key components, which will combine to form the link from the original, basic information gathering to storage, analysis, and reporting. These components should generally include the following.

a) Local data collection

- Detailed data should be collected on the status of telecommunications networks, facilities, and services in each location within designated rural or under-served areas. These should be provided on a regular basis by the telecommunications service providers, as well as by local officials in each area, under the guidance of the USAF.

- The Fund administration should designate the organizations, officials, and locations with formal responsibility to collect and input data for each area, ensuring that all designated regions are covered.

- Official data from local operations should be collected in digital, computerized format, following standardized templates that will produce uniform results from all areas.

- National and regional geographic and demographic data should supplement locally collected data, particularly for areas that do not yet have telecommunications services.

- Survey data from selected locations should be collected periodically to evaluate the impacts and consumer response to the delivery of telecommunications services, and the resulting benefits (or costs) to local rural communities. This data collection will require in-person survey techniques, customized for the locations covered and the topics to be analyzed. They should be managed by the USAF together with local operators and officials.

b) Central database development and management

- The Fund administration should establish and manage a central database of all field information at its headquarters, including defining hardware and software specifications and identifying data inputs to be collected from local sources.

- The database should be based upon standardized commercial software, and implemented on a PC platform, which can be readily learned and utilized by key staff both at the headquarters and in the field. The need for customized programming or overly complex modules should be kept to a minimum, for cost and efficiency reasons.

- In the medium term, the database should ideally be upgraded to include visual, map-based output features, potentially including GIS database information and links to such features as Google Earth and Maps or equivalent, to allow for graphic representation of its contents.

- Periodic updates and improvements to the database should be implemented based on feedback from users.

- Fund personnel should also be responsible for training officials at local sites in the data requirements and use of the hardware and software associated with the system, as well as for building skills within the USAF organization to utilize and understand the data.

- USAF personnel should be able to use the database, as well as customized survey studies, to conduct analysis of the effectiveness, impact, and costs of Fund support programs. They should also be able to provide feedback to Fund Management, as well as Ministry and other Government officials in response to specific inquiries about the status of the ICT sector and of the Fund's performance.

c) Network linking of remote inputs to central database

- The central database should ultimately be linked directly to local offices in rural regions where data is gathered by local operators and officials, so that inputs can be entered automatically and efficiently throughout the system.

- Remote locations should be equipped with standard computer hardware and software with a common data input interface; local officials should be trained by USAF staff to use the system properly, with technical and administrative support available conveniently within the system.

- The locations where local data input facilities should be established may include satellite Fund offices, if any, telecommunications operators' offices, public administration offices within a province or district, and/or telecenter facilities established under USAF programs.

1.8 Database Outputs, Reports

The USAF database should be able to generate a wide range of outputs and reports, including standardized reports produced on a regular basis, and specialized or custom reports as needed.

a) Database standard outputs, reports

- The database system should be set up to produce regular, standard output reports on key information of interest to the USAF and the Government in general. This includes any formal reports required by the Fund's authorizing mandate, as well as other summaries of data that may be of high priority to Fund management, such as for Annual Reports.

- The Fund's statisticians and software engineers (plus vendors) should be responsible for setting up and managing the report output processes, and generating regular (for example, monthly or quarterly) standard reports to USAF management. The formats and contents of these reports should be established according to initial formal requirements, and adjusted as necessary over time.

- The system also should eventually be able to generate GIS-based maps of all designated local geographic service areas, showing precise details on levels of telecommunications access and services, locations of telecenters and other facilities, and additional key data concerning network and service availability. System users should be able to focus on each location down to the most narrow range possible to observe patterns of deployment and usage. See Figure 1 for a representative examples of access coverage by mobile base stations (in Kenya):

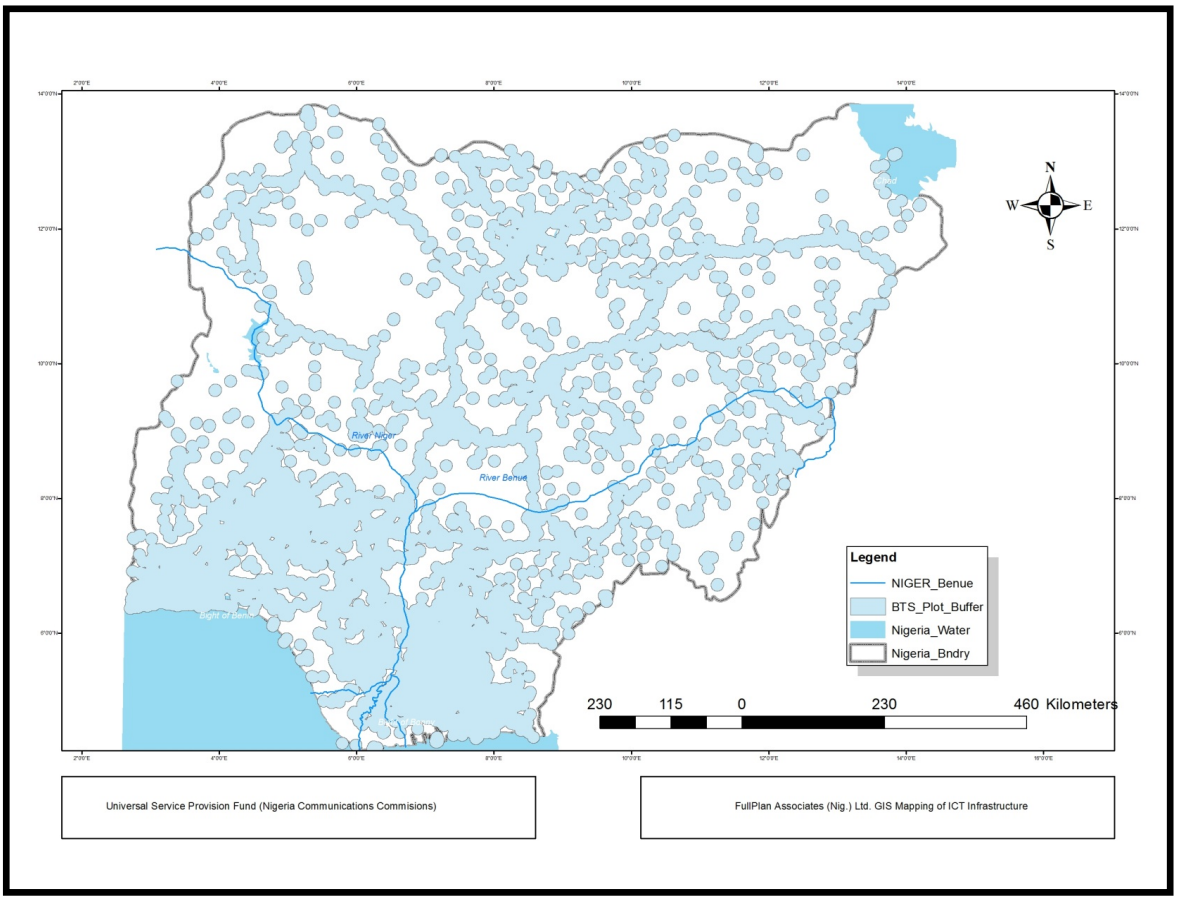


Figure 1: Representative Coverage Map of Mobile Base Stations

b) Specialized market analysis

- The database and data collection processes should also permit USAF staff to conduct specialized market studies and more in-depth analysis to address key questions about the Fund's operations and effectiveness.

- These studies should be conducted by USAF statisticians and economists, utilizing both the standard database information and the findings from custom surveys. They can be developed in response to specific inquiries by Fund management or the Government, and/or they can become regular (e.g., annual) market studies.

II. USAF Market Analysis

This section presents information and examples on a range of prospective ICT Market Analysis studies that USAF administrations should consider undertaking, utilizing the types of data collected according to the sections in Part I. The types of studies addressed in this section include:

1. ICT Access Gap Analysis: The study of gaps in local user access to various types of ICT networks and services, and estimation of the net Fund subsidy costs required to eliminate those gaps.

2. ICT Market Assessment: General assessment of the status of the ICT market and the basis for determining USAF priorities.

3. Broadband/Internet Digital Divide Study: A prototype outline and template for conducting a society-wide study of the factors underlying the digital divide.

4. ICT Demand Study/Survey: A sample survey instrument questionnaire for use in conducting consumer-level surveys of demand-side factors in ICT markets.

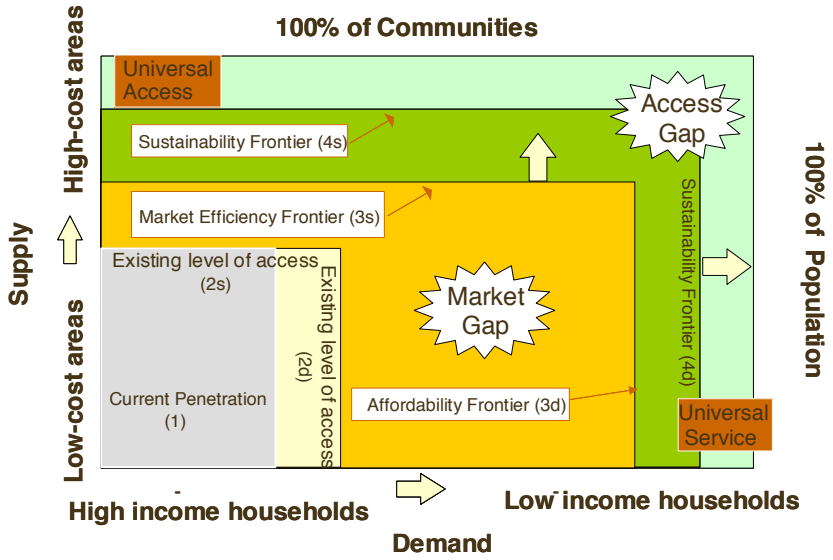
The first section, on ICT Access Gap Analysis, is elaborated in detail here. The other examples are addressed through prototype supporting documents provided in the Annexes.

2.1 ICT Access Gap Analysis

The following discussion presents the basic concepts and methods associated with ICT Access Gap Analysis, a critical component of effective USAF planning and evaluations. It includes background on the theory underlying such studies, and a representative framework for gap modeling. USAF administrations and staff should consider this information as a helpful introduction to and foundation for undertaking such analysis within their organizations, either using internal resources or outsourcing to expert consultants.

Telecommunications Access Gap Theory

Analysis of ICT sector gaps that merit attention by a USAF should be based upon the widely established concepts of Access Gap Theory as applied to telecommunications networks and services. This theory is illustrated by the following graphic:



In summary, the theory asserts that there are several different levels of "access" to any given telecommunications network or service, at any particular moment in time, within a designated geographic market area (e.g., region, province, or entire country). The most pertinent elements of this concept, for purposes of this study, include the following:

- Existing level of access: This portion of the overall market represents those locations, and users, that already have access to the service in question. Along the Y-axis (supply) this consists of the areas of geographic coverage, or other physical access parameters, while along the X-axis (demand), this represents actual service penetration as a proportion of total potential users. Most often, USAF gap studies are concerned primarily with the supply-side.

- Market Gap and Market Frontier: The Market Gap represents those areas where the service is not yet available, but where market forces should be capable of filling these gaps, without outside subsidies. In sum, the potential revenues to be earned from serving these areas should exceed the economic costs of deploying the services. The reasons why service is not yet available may arise from regulatory, political, or other non-economic factors, which may impede market-based expansion; or, commercial interests may simply not have reached these areas yet, but will do so in the near future. The Market Frontier is the theoretical limit to purely market-based expansion, beyond which it would be unprofitable for commercial operators to expand on their own.

- Access Gap: Sometimes called the "true" Access Gap or the "Economic Gap," this portion of the market represents those locations in which the service in question cannot be realistically provided on a commercially viable basis, without some amount of outside subsidy or other support. Here, the average costs of delivering service will exceed the expected revenues from new customers. (This segment is sometimes also divided into "sustainable" and "unsustainable" areas: i.e., locations where a one-time subsidy will allow the service to be sustained thereafter by the market, versus areas that may require permanent, ongoing subsidies.)

The goal of a Gap Analysis study is to determine the status and potential of the various market segments within a country according to this schematic. Such findings help both the communications industry and especially the USAF administration to understand the likely evolution of the market, and where subsidy funds should be strategically targeted.

Gap Model and Analysis Methodology

There are several widely used methodologies and computer-based analytical models that have been developed in recent years to analyze the status of access gaps in various markets. For this Module, we present the framework of a model methodology developed by GBI expert David N. Townsend, which has been applied in numerous countries and studies.[1] This model framework requires country-specific data inputs and adaptation to local conditions in each case, but the basic parameters are summarized in the sections below.

In the prototype model, ICT market status and gaps are evaluated for three main classes of ICT networks and services: Basic 2G mobile telephony, Public Internet access, and Broadband 3G mobile services. The model analyses the status of current service coverage in relation to geographic and demographic characteristics of each geographic market segment, and calculates the estimated net cost to telecom operators to expand their networks into locations currently unserved by each category of service.

The model consists of several components and a variety of assumptions concerning network configuration and cost elements. In summary, these include:

- Inputs: Data on the characteristics of all provinces or regions in the country: municipalities, towns, population, geography, and estimated current levels of access to ICT services (see below).

- Cost Assumptions: Estimates concerning the unit costs for establishing new telecommunications networks and ICT services in areas where such services are not available. This should be defined according to variable parameters, such as geographic coverage, distance, population, capacity, as well as facilities, equipment, service operating costs, human resources, and a variety of other factors. All of these assumptions should be adjustable to test the sensitivity of the results to alternative estimates.

- Network Development: A series of algorithms for the build-out of telecom networks into unserved areas, based upon various characteristics of the locations to be served, such as geographic size, population, numbers of towns, and other factors. The algorithms calculate the approximate cost for a given network configuration, based upon the unit cost assumptions above.

[1] See http://www.regulatel.org/SU_Peter_31_08_07/Full_report-COMPLETE-June_11,2007.Edited_PAS_v.1.pdf

- Revenue Factors: Data and assumptions that determine the anticipated levels of gross customer revenues that operators would receive from the expansion of services into new market segments. These factors should ideally be tied to disaggregated income and spending data for geographic regions, corresponding as closely as possible to designated unserved areas.

- Net Cost Calculations: These calculations should combine the assumptions and factors regarding network development costs and revenue estimates for each unserved area, ultimately yielding the net annual costs (positive or negative) associated with expanding network and service coverage into unserved locations. These results should be determined at the smallest geographic level possible.

- Gap Findings and Subsidy Costs: Based upon the net cost calculations for all areas, the model's results should show the current levels of access for each service studied, the extent of the Market Frontier to which commercial operators will be able to expand on their own, and the net capital cost (subsidy) that would be needed to eliminate the remaining identified gaps for each service category.

Illustrative model components and outputs

The following tables illustrate the components of the prototype model, using a sample province within a representative country. The tables show the general data inputs for the province, the calculations of network development costs for public broadband services, and the net results, with annual deficits and numbers of "addressable" users for such public broadband services within each district.

REGION 1								
	Population Centres				**Public Broadband**			
District Municipalities	**Local Municipalities**	**Pop**	**Area**	**No. of Towns**	**% Access**	**Pop Unsurved**	**Area Unserved**	**Towns Unserved**
District 1	5	1,507,506	32,456	24	45%	832,612	17,926	13
District 2	5	842,699	32,456	13	20%	672,471	25,900	10
District 3	5	463,815	32,456	19	9%	422,688	29,578	17
District 4	4	695,934	25,965	11	51%	342,778	12,789	5
Totals	19	3,509,954	123,333	67		2,270,549	86,193	46

Public Broadband Annual Cost to Close Gaps						
District Municipalities	**Backbone**	**Access**	**Equipment**	**Service**	**Human Resource**	**Total**
District 1	$1,795,896	$424,496	$208,153	$6,331,518	$931,106	$9,691,169
District 2	$1,909,700	$337,423	$168,118	$5,113,745	$752,021	$8,281,007
District 3	$2,636,596	$388,274	$105,672	$3,214,288	$472,689	$6,817,519
District 4	$969,791	$174,122	$85,695	$2,606,623	$383,327	$4,219,558
Totals	$7,311,983	$1,324,315	$567,638	$17,266,174	$2,539,143	$29,009,253

Public Broadband Internet Market Results								
	Current Market		Average Net Gap Cost			Gap results		
District Municipalities	Area unserved	Pop unserved	Annual cost	Annual revenue	Net annual cost	Addressable pop (total)	Uneconomic pop (total)	Net annual deficit
District 1	17,926	832,612	$9,691,169	$12,023,880	-$2,332,711	799,307	33,304	$0
District 2	25,900	672,471	$8,281,007	$9,711,266	-$1,430,259	645,572	26,899	$0
District 3	29,578	422,688	$6,817,519	$6,104,099	$713,420	-	422,688	$713,420
District 4	12,789	342,778	$4,219,558	$4,950,112	-$730,554	329,067	13,711	$0
Totals			$29,009,253	$32,789,357	-$3,780,104	1,773,946	496,602	$713,420

2.2 Other Market Studies

The following represent an additional set of potential USAF ICT market studies, which should be considered by administrations seeking to improve their understanding of the status and needs of the market. Only summary introductions are offered here, while supporting documents are provided in the Annexes.

ICT Market Assessment

In Module #1, USAF Strategic Planning, a framework for a general ICT Market Assessment was included, to help establish the baseline status on which the USAF strategy should be created. This Assessment includes many of the elements highlighted in this Module, at a more general and high-level of detail. A copy of this prototype ICT Market Assessment template is included for convenience with this Module as well, in Annex 1.

Broadband/Internet Digital Divide Study

Annex 2 provides a prototype outline for a comprehensive Digital Divide Study, based on research and field work developed by GBI's experts. The purpose of such a Study is to understand the factors influencing both access to and utilization of advanced ICT services, especially Broadband Internet, within a country. The prototype outline in Annex 2 identifies the main areas of information to be collected and analyzed covered by such a study and included within the research and analysis.

ICT Demand Study/Survey

Annex 3 provides a sample survey instrument for conduct of an ICT Demand Study within a developing country. The purpose of this study would be to focus on the attitudes, perceptions, and decisions of end-users with respect to ICT services and capabilities, to help understand factors that may hinder service take-up or influence the effectiveness of various development initiatives, whether by the USAF or by other

programs and policies. This survey questionnaire can be used to conduct the research necessary for the above Digital Divide Study, or for other market analysis requirements.

Annex I: ICT Market Analysis Template

1. INTRODUCTION

This document presents the ICT Market Assessment to support the forecasts, planning assumptions, program scope, and budget allocations of the Universal Service/Access Fund. The Market Assessment is based upon the most recent and reliable market data for communications network infrastructure, services, economics, and related factors. It provides current status and recent trends in the development of the national ICT market, and specific findings and forecasts concerning Access Gaps in the country, and the subsidy and support policies needed to close these gaps.

The findings and results presented in this document are approximate and tentative in nature, and subject to a range of uncertainties. All underlying assumptions are conservative: i.e., they err on the side of slower growth and higher costs. These findings will be subject to review and revision during each Fund operating year, to adjust the forecasts and results to more accurate and complete data.

Background: National Demographics

Provide a general overview of the country's population, territory, and economy, to create a useful context for the ICT market. Ideally, data should be disaggregated by geographic Region. Include such indicators as:

- Geography: Political divisions, regions, terrain (map)
- Population: By Region: Total persons and density; total households; age and gender distribution; numbers of villages per Region by size groupings;
- Economy: National and Regional employment/unemployment, average household incomes.

2. STATUS OF INFORMATION AND COMMUNICATION TECHNOLOGIES

This section provides an updated overview of the current status and recent trends in the ICT sector in the Country. In particular, it highlights trends in the deployment of network infrastructure, principally wireless networks, and in the utilization of communications services and applications, particularly telephone and Internet.

2.1 INFRASTRUCTURE

Telecommunications network infrastructure consists of many components. The most widely deployed and utilized networks, especially in rural and underserved regions, are wireless (cellular) networks. Access to these networks depends upon signal coverage from cell towers and base stations, as well as connection of those stations to the national backbone network. Construction and operation of these networks also depends upon basic supporting infrastructure such as roads and electricity. This section highlights the state of development of these factors.

Wireless Networks: Figure 2.1 shows the estimated geographic coverage of wireless telecommunications signals in the Country, as of 2011 (or the most recent year):

Figure 2.1: National Wireless Network Coverage Map

Wireless coverage can be summarized in two ways, by geographic territory and by population within range of wireless network signals:

Table 2.1: National Wireless Network Coverage, 2008-2011

Test	2008	2009	2010	2011
Geographic	XX%	XX%	XX%	XX%
Population	YY%	YY%	YY%	YY%

National Backbone: The following indicators describe the coverage and capacity of national telecommunications backbone network infrastructure:

Provide available indicators, such as:

- Km of fiber, microwave nationwide
- Satellite backbone coverage, utilization
- % of territory/villages within 50 km, 100 km of backbone
- Transmission capacity (main network and extensions)
- Other

Map(s) of national backbone network(s)

Supporting Infrastructure: Availability and access to other forms of infrastructure can also have a significant impact upon potential access to ICTs. The following indicators highlight some of these factors:

Provide available indicators that may be most relevant, such as:

- % of rural households with access to electricity grid
- % of villages served by adequate roads
- Other?

2.2 SERVICES AND APPLICATIONS

A range of providers use the network infrastructure to offer communications services and applications.. While there are many types and layers of these services and applications, the most widespread are telephone service (traditional voice calling, as well as sms texting and other applications that can utilize the basic telephone network), and Internet service (connection to the Internet to access a variety of applications such as e-mail, web browsing, etc.). This section highlights various measures of the telephone and Internet service markets in **Country.

Telephone Service:

In the cellular mobile world, measures of telephone service "users" are difficult to quantify exactly. Many users own multiple phones and SIM cards, and these trends are changing constantly. Table 2.2 provides three estimates of "penetration" of telephone service in the Country: total SIMs, estimated individual users (persons with at least one phone), and households (where at least one person in the household has a phone).

Table 2.2: Estimates of Telephone Users

Test	2009		2010		2011	
	Total	% of pop	total	% of pop	total	% of pop
Total active SIMs	Xxxxxxxxx	XX%	Xxxxxxxxx	XX%	Xxxxxxxxx	XX%
Individual customers	Xxxxxxxxx	YY%	Xxxxxxxxx	YY%	Xxxxxxxxx	YY%
Households with phones	Xxxxxxxxx	ZZ%	Xxxxxxxxx	ZZ%	Xxxxxxxxx	ZZ%

Additional indicators of telephone service penetration and usage include the following:

- Traffic:

Minutes of Use (m)	**2009**	**2010**	**2011**
Domestic	xxxxx	xxxxx	xxxxx
International	xxxxx	xxxxx	xxxxx

SMS messages (m)	2009	2010	2011
Domestic	xxxxx	xxxxx	xxxxx
International	xxxxx	xxxxx	xxxxx

- Prices (average):

Voice Calls (per min)	2009	2010	2011
On-Net	xxxxx	xxxxx	xxxxx
Off-Net	xxxxx	xxxxx	xxxxx
International	xxxxx	xxxxx	xxxxx

SMS messages	2009	2010	2011
On-Net	xxxxx	xxxxx	xxxxx
Off-Net	xxxxx	xxxxx	xxxxx
International	xxxxx	xxxxx	xxxxx

- Revenues:

Telephone Services	2009	2010	2011
Domestic	xxxxx	xxxxx	xxxxx
International	xxxxx	xxxxx	xxxxx
Total	xxxxx	xxxxx	xxxxx

Internet:

Measurement of Internet usage presents special challenges, as individuals can access Internet connections via multiple devices and services, and their use can range from very occasional to very heavy. Also, Internet users access a wide variety of applications for different purposes, and these variations are even more difficult to track across the population. The following indicators provide some basic estimates of the number of Internet users and of Internet utilization in **Country.

- Users:

  Provide available data on numbers of Internet users, such as:

  - Mobile 2G, 3G users
  - Fixed Internet (broadband) subscriptions (households, businesses)
  - Numbers of students accessing Internet at schools, universities
  - Numbers of users at public Internet Cafés, Telecenters

  Provide indicators for 2009-2011, if available, as well as any breakdowns for urban vs. rural users

- Prices and Revenues:

Provide average price indicators (2009-11) for Internet services, such as:

- Charge per MB for mobile Internet use
- Monthly charges for fixed (broadband) Internet subscriptions
- Wholesale Internet capacity prices paid by ISPs (per Gbps or other)

Provide annual industry revenue indicators (2009-11) for Internet services, such as:

- Mobile Internet revenues
- Fixed Internet revenues: households, businesses
- Revenues of ISPs
- Wholesale Internet market revenues

3. ACCESS GAPS

This section identifies and described the Access Gaps in the national ICT sector. In particular, it examines in detail existing gaps in access to wireless telecommunications network infrastructure, as well as a range of indicators of the extent of access to Internet services.

3.1 WIRELESS NETWORK ACCESS

Figures 3.1 and 3.2 identify the scope of geographic and population coverage gaps for wireless telecommunications network access in the Country, as of the most recent year:

National Map showing unserved areas (same as in Section 2)

Regional Maps showing greater detail of unserved areas

Table 3.1 provides details on the extent of coverage gaps for each Region, indicating the total territory, number of villages, and population for each region, and the amounts of each that are unserved by wireless network signals:

Table 3.1: Wireless Network Access Gaps by Region (2011)

Region	Territory (km^2)		Villages		Population (000)	
	Total	Unserved	Total	Unserved	Total	Unserved
Region 1	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx
Region 2	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx
Region 3	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx
Region 4	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx
Region 5	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx
Region 6	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx

[NOTE: If even greater detail is available, this can be included in an Annex.]

3.2 PUBLIC INTERNET ACCESS

The following indicators provide an overview of the scope of availability of Internet access to the public in non-urban areas of the Country, via different facilities and services, which could be expanded with assistance from the Fund.

Wireless Internet Access Services:

Describe scope of 2G, 3G, coverage, also any WiMax, VSAT, or other available services: population and territory covered.

Schools, Universities:

Provide indicators of the numbers and % of schools and university classrooms with Internet access.

Government Offices:

Provide indicators of the numbers and % of national, local, and regional government offices that have Internet connections; include indicators of Post Office locations as well.

Community Centers, I-Cafés, Telecenters:

Provide indicators of Internet use at public access facilities such as Community Information Centers, I-Cafés, Telecenters, etc. Estimates should ideally include numbers of such facilities around the country and by Region, and numbers of users (per year) per facility.

4. ECONOMIC ANALYSIS AND FORECAST

This section contains the results of Fund's economic analysis of ICT market trends, and estimations of future developments. It provides basic calculations of the expected net costs that communications industry operators would face to expand infrastructure and services into unserved areas – and hence of the likely subsidy amounts that the Fund will have to support. All findings and calculations are based upon the Fund's best information and assumptions, utilizing conservative scenarios.

4.1 SECTOR GROWTH FORECAST

Table 4.1 provides a summary forecast for anticipated growth in key indicators for network infrastructure coverage, and telephone and Internet services.

Table 4.1: Infrastructure and Service Growth Forecast

	2011	2012	2013	2014	2015	CAGR
Network coverage (pop)	XX%	XX%	XX%	XX%	XX%	YY%
Telephone users	Xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	YY%
Telephone revenues	Xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	YY%
Internet users	Xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	YY%
Internet revenues	Xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	YY%

4.2 ACCESS GAPS NET COSTS

This section provides forecasts and calculations of the estimated net costs that would be required to close the access gaps identified in the previous section. These results are based on a variety of assumptions and subject to considerable uncertainty, but provide an adequate basis for estimating the range of USAF subsidies that will be needed to support sustainable infrastructure and service expansion into these unserved areas.

[Note: if possible, all results in this section should be calculated on a Regional basis. If data are not available, then national averages for all gaps may be necessary. All methods, data, and assumptions utilized to produce these estimates should provided in an Annex.]

Regional Infrastructure:

Estimate the degree of new infrastructure required to eliminate coverage gaps in each Region:

- Number of sites required (towers, base stations)
- Backbone network extension (km)
- Additional infrastructure and support required (e.g., roads)

Net Cost Calculations:

Develop estimates of the net costs to provide basic network infrastructure and telephone services in unserved areas, based on the following components, using available data, inputs, and assumptions. Break down by Region or other distinctions (e.g., population density) to the extent possible.

- Average Capital Costs per site:
    - Backbone network extension
    - Tower
    - Base station
    - Electric power
    - Supporting infrastructure (roads, etc.)
    - Other

- Average Annual Operating Costs per site:
    - Maintenance
    - Power
    - Security
    - Other

- Net Revenue forecast:

  Estimate average annual net revenues (per site or per Region), based on population, incomes, usage patterns, etc.

  [Note that net revenues should represent net income to operator, after sales, service, and other direct customer-related costs. These estimates will likely be very approximate, and should err on the conservative side.]

- Net Subsidy Requirements:

  Calculate estimated subsidy requirements per-site, and/or per Region, to support delivery of network infrastructure and basic telephone services, according to the results of the previous sections.

  [Note that this calculation requires determining a service-life period, e.g., 5 years, and a breakeven cash-flow analysis. This method should be simplified to arrive at approximate results.]

Network upgrades, Internet services and facilities:

The following results estimate the net subsidy requirements to support provision of Internet services (incremental to basic infrastructure and telephone services) in underserved locations:

- Internet Service Network Upgrades: Provide estimates and calculations for the costs (capital and operating) and net revenues to deliver network and service upgrades (e.g., 3G service) in underserved areas. Estimate per-site and/or per-Region average subsidy costs required to support such upgrades.

- Public Access Internet Facilities: Provide estimates and calculations for the costs (capital and operating) and net revenues associated with providing public Internet access via a Telecenter or equivalent public facility. Indicate costs for equipment, building, human resources, training, etc.

- School or Government Internet: Provide average estimated costs (capital and operating) to provide Internet facilities at schools, government offices, and similar public service locations.

Annex II: Digital Divide Study Report Outline

This document provides a high-level Outline of a prototype Internet/Broadband Digital Divide Study. This Outline is intended to identify the main areas of information to be covered by such a study and included within the research and analysis. This is an idealized, full-scale depiction of how this study might look if all data collection objectives were met. Realistically, much of the data may be difficult to obtain in many countries, and the study report will likely have to be scaled back in some areas.

The Table of Contents below shows the entire outline structure:

Table of Contents

1.1 1. Introduction/Overview

Introduction to the Report, summary of its objectives approach.

1.2 2. Measurements of Internet and Broadband Market Status

This section provides statistical measures of Internet and Broadband markets in a country, including recent development trends. The key indicators should include measures of underlying infrastructure and access networks, demand-side penetration and usage, and supply-side market structure and development. Measurements of the markets for Internet-capable devices and end-user applications are also included.

2.1 Infrastructure and Access

The scope of telecommunications network infrastructure availability and capacity to provide Internet and Broadband-level connectivity. Information in these sections should ideally be represented in both tables (by Region) and Maps, showing coverage of different networks and services.

2.1.1 Network Infrastructure Coverage

Geographic and population coverage of various forms of network infrastructure:

- Wireless mobile networks (2G, 3G)
- Backbone network capacity
- Satellite (VSAT) systems
- WiMax access networks
- Fixed broadband access connections: fiber optic, ADSL, cable TV, others

2.1.2 Public Access Facilities

Numbers and % coverage of various public locations for obtaining Internet access:

- Community Information Centers (CICs)
- Commercial cyber cafés
- Schools and universities with Internet connections
- Government offices with Internet connections

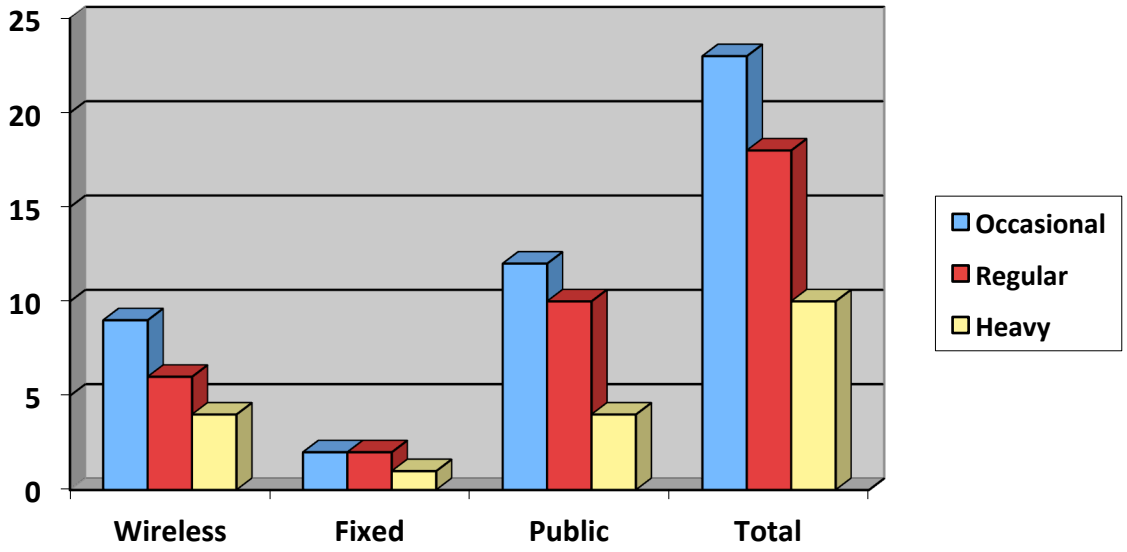
- Post offices allowing Internet access and services
- Others

2.2 Internet and Broadband Users/Demand

Measurement of Internet usage presents special challenges, as individuals can access Internet connections via multiple devices and services, and their use can range from very occasional to very heavy. This section presents various basic indicators of Internet and Broadband penetration in the country from the demand side.

2.2.1 Overview of Internet Users

This section provides a summary overview of the numbers of Internet users. Based upon available data, it should highlight estimated users of different types of Internet access (wireless, fixed, and public), according to degree or frequency of use (occasional, regular, heavy). The graph below provides one example of how this information might be represented (this is shown as % of population, but it could also be absolute numbers):



2.2.2 Characteristics of Internet Users

This section describes in more detail the characteristics of individual Internet users, according to a variety of factors. Data can again be shown in graphic as well as table form. Key details to address should potentially include:

- Location of use (Job, school, home, café, mobile?)
- Geographic distribution of users by region, city/town/rural
- Age and gender
- Income, job status
- Other available characteristics

2.2.3 Internet and Broadband in Enterprises

Description of the status and use of Internet and Broadband in commercial enterprises. Ideally, this section should include as much detail as possible, from a combination of survey responses and individual company interviews, as well as available studies and statistics. Much of this section is likely to be anecdotal or summaries of known activities, rather than purely statistical or comprehensive.

Key categories of indicators that should be included (with recent trends), if possible:

- Estimated # and % of companies that have Internet/Broadband connections in the workplace (by large, medium, and small businesses)

- Estimated # and % of employees who use Internet as part of their job responsibilities (also by large, medium, and small businesses)
    - This could be further broken down by type of use: e-mail, web research, marketing, purchasing, etc.

- Financial sector use of Internet:
    - Proportion of banks and financial firms using Internet (web sites, e-transactions, etc.);
    - M-banking, e-banking indicators: numbers of users, value of transactions;
    - Status, growth of consumer credit options, usage
    - Role and scope of Internet in investments, stock market, etc.

- Indicators on E-commerce:
    - Volumes and value of on-line transactions;
    - B-to-B and B-to-C market indicators
    - Types of products and services sold on-line
    - International e-commerce market (sales and purchases)

2.2.4 Internet and Broadband in Government

Data, study results, and other findings regarding the extent of Internet and Broadband deployment and utilization in Government agencies. These should ideally include, for example:

- Numbers and % of public offices that are connected to the Internet
- Use of Internet by public employees in their jobs, including e-mail, web-based research, etc.
- E-procurement by public agencies
- Use of Internet in hiring
- Other indicators

This section should seek to cover both national and regional/local governments.

Note that E-Government Applications are covered in Section 2.5.3, below. This section applies to availability and use of Internet by Government offices and personnel.

2.3 Internet and Broadband Market Structure/Supply

This section describes the market for supply of Internet and Broadband services in the country. This should include indicators as to the economic and financial characteristics of the market, such as sales, revenues, degree of competition, employment, and similar factors. It should include both wholesale and retail suppliers, where appropriate.

2.3.1 Wholesale Internet Capacity and ISP Markets

- Suppliers, prices and revenues for wholesale Internet (backbone) capacity, including International and Domestic. Changes in pricing over the past few years.

- Numbers, size, and competition (e.g., market share) among Internet Service Providers. Pricing structure for wholesale ISP services, including changes over time.

2.3.2 Wireless Internet Services Market

- Numbers, size, and competition (e.g., market share) among wireless Internet Service Providers, especially 3G service.
- Indicators of average retail prices for wireless Internet service, including changes over time.
- Estimated revenues from wireless Internet services in recent years.

2.3.3 Fixed Internet Services Market

- Numbers, size, and competition (e.g., market share) among fixed Internet Service Providers, including fiber, ADSL, cable TV, others.
- Indicators of average retail prices for fixed Internet service, including changes over time. Differences between classes of service and customers, if appropriate (e.g., household, business, government).
- Estimated revenues from fixed Internet services in recent years. Differences between classes of service and customers, if appropriate (e.g., household, business, government).

2.3.4 Public Access Internet Services Market

- Numbers, locations, and usage data for commercial Internet Cafés.
- Revenue and pricing data for commercial Internet Cafés.
- Data and examples for other public Internet business models: e.g., Wifi in restaurants, airports, etc.

2.3.5 Supply of Internet-Related Technical Services

For each type of service, estimates of numbers of companies, employees, revenues:

- Installation, maintenance, repair of computers, equipment, networks
- Software and applications development; web site design
- On-line marketing, advertising services

2.4 Internet/ICT Equipment and Devices

This section presents data and findings regarding the extent of penetration of end-user equipment and devices that connect to the Internet. The use of such devices represents another perspective on the scope of Internet-oriented demand and activity. Device penetration should be examined from two perspectives, demand by customers and sales by suppliers, which can show both recent trends and current use.

2.4.1 Device Demand and Usage

- Estimated numbers of owners/users of each major category of Internet device (with recent trends):
    - Personal computers, laptops
    - Smart phones
    - Tablets
    - Wifi routers, other periperhals

2.4.2 Device Supply Market

- Data on the supply market for each of the Internet-capable devices above:
    - Number and size of import companies and retail outlets
    - Annual gross sales revenues and units sold
    - Business versus consumer markets
    - Estimated retail price ranges for each type and sub-class of device (e.g., newer generation, higher capacity, etc.)
    - Used/refurbished vs. new device markets

2.5 Internet-Based ICT Applications

This section should provide estimates of the numbers and proportion of users of various types of Internet-based (on-line) software applications, web sites, and other capabilities enabled by Internet and Broadband connectivity and devices. Ideally, the data should show absolute volumes of users and relative rankings, while also providing some indications of intensity or frequency of use.

2.5.1 Consumer Applications

- Classifications/rankings of the purposes for using Internet services by consumers/individuals (by general category of use):
    - Social networking
    - Communication
    - News, commentary
    - Education, research, knowledge
    - Entertainment, sports, games
    - Government services and information
    - E-Commerce, financial services, commercial information

- Popularity, ranking, usage data for on-line applications used primarily by consumers, including adults, students, women, other groupings (specific websites or applications):
    - Social networking (Facebook, Youtube, Blogs, other popular sites)
    - E-mail, chat, skype
    - Local news, information, entertainment sites

- General (global) Web search, information sites: Google, Yahoo, Wikipedia, etc.
- E-Commerce sites (also see below)
- E-Government sites (also see below)
- Mobile apps

2.5.2 Business and Financial Applications

- Indicators for the most prevalent on-line applications created and utilized primarily by business enterprises:
  - Marketing and advertising applications and web sites
  - E-commerce applications and sites (B-to-B, B-to-C)
  - Financial services applications (e-banking, m-banking)
  - Small and micro-enterprise oriented apps: e.g., accounting, tax services
  - E-Agriculture and apps aimed at farmers, etc.

2.5.3 Government and Public Service Applications

- Indicators of the types, availability, scope, and use of e-Government on-line applications and services, e.g.:
  - Web sites for Government departments
  - Applications to assist with citizen information, instructions, engagement with particular programs
  - On-line interactive forms submission (taxes, certifications, payments, etc.)
  - Local/municipal web sites
  - Political-oriented sites and apps: party advocacy, voter information, etc.

1.3 3. Why the Digital Divide?

This section will examine the underlying causes and reasons for the digital divide. It should present data and analysis that indicate the nature and scope of barriers to Internet and Broadband deployment, access, utilization, affordability, awareness, and other key factors. The analysis should be broken down into three main categories:

3.1 Consumers and Households

- Indicators of consumer/household attitudes and choices regarding Internet and Broadband use; differences between users and non-users:
  - Service cost/price
  - Service availability, access
  - Interest, awareness
  - Value, relevance of services, applications
  - Device cost/availability
  - Etc.

3.2 Business Sector

- Indicators of business sector attitudes and choices regarding Internet and Broadband use within business operations; differences between users and non-users:
    - Relevance, value of Internet to business operations
    - Cost of service, devices
    - Employee capacity
    - Awareness
    - Access, availability
    - Etc.

3.3 Government

- Indicators of Government agency policies and practices that influence choices regarding Internet and Broadband use within agency operations:
    - Senior management awareness, planning, priorities
    - Employee capacity
    - Cost of service, devices, operations
    - Availability, access
    - Perceptions of value, impact of Internet/e-Government
    - Etc.

1.4 4. Socio-Economic Impacts of Broadband/Internet

This section should provide analysis of the economic and social impacts of Internet and Broadband access and use, based on available data and perceptions. If possible, quantification or measurement of relative impacts; otherwise, more general discussion, examples, benchmarks, etc.

4.1 Economic Impacts

Jobs, incomes, business activity, savings, efficiencies, etc. Differentiate between Urban/Rural, large and small business, and household/individual impacts and opportunities.

4.2 Social Impacts

Community development; effectiveness of Government services; improvements in social indicators such as health and education; impacts on women, youth, disabled, etc.; political impacts.

1.5 5. Forecast and Recommendations

This section should develop a set of forecasts of potential growth and impacts of increased Internet and Broadband access and use over an approximate 5-year time horizon. It should then identify the key bottlenecks and drivers associated with different scenarios, together with specific recommendations for policy initiatives and USAF projects in particular which could help maximize potential growth and benefits.

Annex III: Digital Divide Demand Survey

Section I - Preliminary Information – To be completed by enumerator before survey begins

Date of interview _____.
Name of Interviewer. _____ .
Name of Interviewer's Supervisor. __ _____ .
Name of village/Locality _____.
Name of district _____
Rural / urban context

Rural (1)	Peri -urban *(2)*	Urban (3)

This household is the interviewer's _____ household interviewed today

Section II - Household Descriptors

1. Name of respondent (*optional*):
   _____

2. Relationship to the head of household

Head of household (1)	
Spouse (2)	
Son / daughter (3)	
son/daughter in law (4)	
Grandchild (5)	
Father / mother. (6)	
Father / mother-in-law (7)	
Brother / sister (8)	
Brother / sister in law (9)	
Other (10)	

3. Age of respondent
   (Please tick the appropriate box for age of respondent)

15 –24……(1)	
25 – 40……..(2)	
41 – 64……..…(3)	
65+……..(4)	
Prefer not to answer……(5)	

4. Gender:

(Observe and tick appropriate box)

Male (1)	
Female (2)	

5. What is the highest level of education that you have completed?

(Tick only <u>one</u> box indicating the highest level of education mentioned)

No formal schooling. ……(1)	
Primary school ……(2)	
Junior High School (JHS) (forms I to III)……...(3)	
Senior Secondary school (forms IV to VI)……..(4)	
Post Secondary, e.g. diploma, degree etc.……(5)	
Post graduate, e.g. diploma, degree, etc……..(6)	

6. Do you know how to read and write?
(Tick appropriate box)

Yes (1)	
No (2)	

7. Which languages do you use to speak and to write? Please indicate respondent's first spoken and written language, and any second language which they can speak or write.

8. Household Size
    a. How many persons regularly sleep in this dwelling?_____
    b. Are there any persons that previously slept most nights in this dwelling but who have since temporarily moved away, and *who intend to return one day*? If so, how many _____?
    c. How many persons that regularly sleep in this dwelling would consider themselves as belonging to a household whose primary dwelling is in a physically different location? _____?

(Note to data entry professional: "Persons Present" = 8a. "Household Size" = 8a +8b – 8c)

Section III - Socio-Economic Classification of Household

9. Which of the following best describes your primary job?

Farmer	Laborer	Professional	Self-employed/personal business	Trader	Government employee	Unemployed (inc. housewife or student)	Other

10. Select from the below list the description that best applies to this dwelling

(1) Semi-detached House
(2) Flat/Apartment
(3) Room(s) [Compound House]
(4) Huts [same compound]
(5) Huts [different compound]
(6) Tents/Improvised Home

10. Does your household have the following?

Electricity	Yes *(1)*	No ***(2)***
Fixed phone (line)	Yes *(1)*	No ***(2)***
Television	Yes *(1)*	No ***(2)***
Fridge	Yes	No

	(1)	*(2)*
Radio	Yes *(1)*	No ***(2)***
Internet connection (of any sort)	Yes (1)	No (2)
Pay-per-view TV	Yes (1)	No (2)

11. How much do you earn your primary job? (Choose an option from the list, and choose a frequency)

Earned Income in GHc ***(Tick only one box)***	
None……..….0	
Less than 39.9	
40 - 99.9	
100 – 199.9	
200 – 299.9	
300 - 399.99	
400 – 499.99	
500 – 599.99	
500 – 599.99	
600 – 699.99	
700 – 799.99	
800 – 899.99	
More than 900	

Frequency of Payment ***(Tick only one box)***	
Per Month ……1	
Per Week……..2	

12 a) If respondent selects “Monthly,” how many months per year are they able to earn this type of salary

b) I the respondent selects “weekly,” for how many weeks per month are they able to find work at this wage rate?

13. Non-earned income: What is the total average monthly income received from the following sources: Public Transfers (such as senor citizen pensions, disability pensions, or other transfers from government or NGOs), Private transfers (i.e. remittances or gifts from individuals), or Rental/Investment income.

Public Transfers

Income from Other Sources ***(Tick only one box)***	
None……..0	
Less than 39.9	
40 - 99.9	
100 – 199.9	
200 – 299.9	
300 399.99	
400 – 499.99	
500 – 599.99	
500 – 599.99	
600 – 699.99	
700 – 799.99	
800 and up	
Prefer not to answer	

Private Transfers

Income from Other Sources ***(Tick only one box)***	
None……..0	
Less than 39.9	
40 - 99.9	
100 – 199.9	
200 – 299.9	
300 399.99	
400 – 499.99	
500 – 599.99	
500 – 599.99	
600 – 699.99	
700 – 799.99	
800 and up	
Prefer not to answer	

Rental/Invest. Income

Income from Other Sources ***(Tick only one box)***	
None……..0	
Less than 39.9	
40 - 99.9	
100 – 199.9	
200 – 299.9	
300 399.99	
400 – 499.99	
500 – 599.99	
500 – 599.99	
600 – 699.99	
700 – 799.99	
800 and up	
Prefer not to answer	

15. How much do you spend on the following goods per month, week

Food	
Housing, Water, Electricity, Gas	
Entertainment, Alcohol/tobacco, Travel eg trotro, cab,)	
Education/Training	

16. Self-Consumption: How much of the food your family consumes is not purchased, but rather grown/produced at home or by a community collective to which you are entitled a share?

Most to all (1)	About 3/4 (2)	About Half (3)	A little (4)	None (5)

Section IV – Household Use of ICTs

Section 4.1 – Separating Internet and Broadband Internet users from non-Internet users.

We define users of the Internet and users of Broadband Internet as people that have used the Internet or Broadband Internet in the last month, and non-users as people that have not.

17 Have you used either Internet or broadband Internet in the last month?
(please tick the appropriate box)

	Yes	No
Broadband		
Internet		

If the respondent is not an Internet or broadband Internet user please go to question 19. If the respondent is an Internet and broadband Internet user go to question 18

18. Which have you used most in the last month, Internet or broadband Internet?
(please tick the appropriate box)

Broadband	
Internet	

Please go to question 21 (skip 19 and 20, following receipt of response to 18)

19. Has someone used the Internet or Broadband Internet on your behalf in the last month? e.g. to get you information you needed
(please tick the appropriate box)

Yes	No

If no one has used the Internet or Broadband Internet on the respondents' behalf, please go questions 20. If someone has use the Internet/Broadband Internet on the respondent's behalf go to question 22.

20. Please tell us why you do not use the Internet or broadband?
(please tick the appropriate box)

Devices for accessing the internet are too expensive	
I don't know what they are/I have never heard of them	
There is nowhere near my home where I can access the Internet	
They are to expensive	
The Internet and Broadband are bad	
I do not see the value in using the Internet of Broadband	

I don't know how to use them	
My friend and colleagues don't use them	
They don't work well	
Other	

If the person answers 'I don't know what they are/I have never heard of them' go to question 35. If a different answer is given continue.

Section 4.2 – Understanding constraints affecting non-Internet and Broadband Users

21.1 If the respondent answered "there is nowhere near my home where I can access the Internet/Broadband Internet" ask "If access to the Internet were provided near your home, would you use it?"

Circle One: Yes No

21.2If the respondent answered "They are too expensive " ask them:

How much do you think the Internet and Broadband Internet costs to access?

	GHC	Frequency
Broadband Internet		
Internet		

21.2How much would you be willing to pay to access the Internet or Broadband? _____

	GHC	Frequency
Broadband Internet		
Internet		

22. Have you used a Computer in the last month?

Circle One: Yes No

If yes, go to question 22 a.. If no, skip to question 23.

22 a. When you used the computer, what did you use it for? (select all that apply)

Email (1)	Obtaining news or information (2)	Facebook/Youtube (3)	Writing a document (4)	Other (5)

23. In the last month have you ever used a mobile phone for any of the following?

Email (1)	What's App, BBM Messenger (2)	Facebook/Youtube (3)	Download a document (4)	Download Steam video (5)	Surf the Net (6)

Section 4.3 – Understanding the Behavior of Internet and Broadband Internet Users

24. Please put a check next to any of the devices you own (multiple answer aloud)

Internet Enabled Cell Phone (1)	Laptop (2)	Desktop (3)	Tablet (4)	Wifi Router (5)

If the respondent is a user who lets someone use the Internet/Broadband Internet on their behalf, please go to question 26

24. Please tell us what how you connect to the internet/Broadband Internet (multiple answers aloud)

Modem/ISDN Dial –up (1)	ADSL (2)	Mobile Modem/Dongle (3)	Using Mobile Phone (4)	Wifi Router (5)	Other (6)

24. Please tell us what devices you most frequently use to access the Internet/Broadband Internet and where you use them. In the box below, write a "1" in the box that describes the device/location combination most frequently used to access the Internet. Write a "2" in the device used second most frequently. Continue with "3", "4", "5" etc until you have described every device/location combination that you use to access the Internet/Broadband Internet on a monthly basis.

	Ranking Places where people access the Net					
Places where people access the net	Cell Phone	Laptop Computer	Desktop Computer	Tablet (such as iPad)	Internet enabled TV	Other (write in)
At home						
Private Internet Café						
Public Telecenter						
School, University, etc						
At work premises						
Local government						

offices/building eg. District Assembly						
Friend, relative, or colleagues house						
Post office						
All locations - i.e. mobile use.						
Other						

If the respondent reports using a cell phone proceed to questions 25 a and b. If not, skip to question 26.

25 a) Does the phone you primarily use to access the Internet/Broadband Internet belong to you or to someone else?

Circle One: Me Someone Else

b) If the primary phone used belongs to someone else, do you have to pay them to use it?

Circle One: Yes No

26. For each item in the left hand column, ask the respondent if they use the Internet/Broadband Internet for that purpose. If they do not, ask them to choose a reason why from the list below the table, and enter the code for that reason in the "'Do not use' code" box. If yes, ask them to select the response from the bolded choices in the first row that best describes their frequency of use. Place an X in the appropriate box.

	Does not use the Internet for this purpose	"Do not use" code	Uses seldom (once in the last year)	Uses rarely (once in the last month)	Uses sometimes (once or twice in the last week)	Uses daily	Uses frequently (multiple times per day)
As part of my primary job							
As a way of earning income that is not my primary job.							
As a way of finding a job, or improving my prospects for being hired							
Contact with Family and Friends							
Entertainment							
To use a government service							

Education							
Improve my or my family's health							
News							
Banking or money transfer							
Other							

Reasons for not using the Internet/Broadband Internet for specific purposes ("Do not use" codes)

1) I do not have a job
2) There are no computers or no Internet connection at my place of work
3) I use non-Internet methods for this and it would be too costly to change
4) This particular service is not available to me in my area
5) This task is too sophisticated for the device that I usually use to access the Internet (i.e. can't use GPRS device to access online government forms).
6) I would not know how to use the Internet for this purpose
7) It is not worth the cost to use the Internet for this purpose
8) I do not trust the Internet enough to use it for this purpose
9) My friends or peers do not use the Internet for this purpose
0) Other

If the respondent uses the Internet/Broadband Internet as part of their primary job, answer question 27. If not, skip to question 28.

27. For each item in the left hand column, ask the respondent if they use the Internet/ Broadband Internet for that purpose at their primary job. If yes, ask them to select the response from the first row that best describes their frequency of use. Place an X in the appropriate box. If not, move to part c).

	Does not use the Internet for this purpose	Uses seldom (once in the last year)	Uses rarely (once in the last month)	Uses sometimes (once or twice in the last week)	Uses daily	Uses frequently (multiple times per day)
Communicate with colleagues or partners via email						
Communicate with clients via email						
Communicate with suppliers via email						
Accounting and/or Payroll Management						
Reporting to the						

government						
Finding information relevant to my business using a search engine or other such site						
To participate in an industry association						
Sales via an e-commerce site						
Purchases via an e-commerce site						
Marketing						
Voice over IP such as Skype						
Other						

If in question 26, the respondent indicated that they use the Internet/Broadband Internet as a way of earning income that is not part of their primary job, proceed to question 28. If not, skip to question 29.

28. Describe the activity (not your primary job) for which you use the Internet/Broadband Internet to earn Income.

_____

(Write the activity on this line)

If in question 26, the respondent indicated that they use the Internet/Broadband Internet as a way of staying in touch with family and friends, proceed to question 29. If not, skip to question 30.

29. For each item in the left hand column, ask the respondent if they use the Internet/Broadband Internet in that way to stay in touch with Family and Friend. If yes, ask them to select the response from the first row that best describes their frequency of use. Place an X in the appropriate box.

	Does not use the Internet for this purpose	Uses seldom (once in the last year)	Uses rarely (once in the last month)	Uses sometimes (once or twice in the last week)	Uses daily	Uses frequently (multiple times per day)
Email						
Social Networking site e.g. Facebook						
Voice over IP (Skype or Google Voice or other)						
Twitter						

Instant messaging						
Other						

If in question 26, the respondent indicated that they use the Internet/Broadband Internet for entertainment, proceed to question 30. If not, skip to question 31.

30. For each item in the left hand column, ask the respondent if they entertain themselves in that way on the Internet/Broadband Internet. If yes, ask them to select the response from the first row that best describes their frequency of use. Place an X in the appropriate box.

	Does not use the Internet for this purpose	Uses seldom (once in the last year)	Uses rarely (once in the last month)	Uses sometimes (once or twice in the last week)	Uses daily	Uses frequently (multiple times per day)
Social Networking						
Downloading Music						
Streaming Music						
Downloading Video						
Streaming Video						
Political news/gossip sites						
Other						

If in question 26, the respondent indicated that they use the Internet/ Broadband Internet *for accessing government services, proceed to question 31. If not, skip to question 32.*

31. Which online government service do you most frequently use and how frequently you use it?

Service: _____
Frequency (from the same set of 5 choices above):_____

If in question 26, the respondent indicated that they use the Internet/ Broadband Internet *for "other" purposes, proceed to question 32. If not, skip to question 33.*

32. What "other" purposes do you use the Internet/Broadband Internet for? How frequently?

Service: _____
Frequency (from the same set of 5 choices above):_____

33. How much do you usually spend on accessing the Internet/ Broadband Internet (please tick only one, from either the monthly or weekly column, answers in local currency)

Per Month	**Per Week**
_____Less than 7.5	____Less than 2

_____7.5-10	____2-2.5
_____10-15	____2.5-4
_____15-25	____4-6
_____25-35	____6-9
_____35-45	____9-12
_____45+	____12+
_____None	____None
_____Prefer not to answer	____Prefer not to answer

34. What, in your opinion are the top three benefits of using the Internet /Broadband Internet?

_____Entertainment
_____Easier/quicker to gain information for doing business
_____Easier to keep up with friends and family
_____Easier and quicker to get information from government
_____Buying things online
_____Selling things online
_____Easier/quicker/safer to get money from transfers/remittances money
_____Helps one keep up with current gossip/fashions/happenings
_____Learning the news
_____Easier to follow sports teams
_____Enables me to save time and money doing certain activities
_____Speed/ease of communication (much faster than writing a letter)
_____Being able to store information or records
_____ Helps me with dating
_____ Helps me stay religious

Section 4.4 – Use of Mobile Telecommunications

35. In the last month, have you used a mobile phone for voice or text communications?

Circle One: Yes No

If yes, proceed to question 36. If no, skip to question 38.

36. Was the phone you used most frequently your own, that of a family member, or belonging to someone else?

Circle One: My own Family Member Other

37. How much do you spend on mobile phones (voice and text)? (please tick only one, in either the per month or per week column, answers in local currency)

Per Month	**Per Week**
_____0-5	_____0-1
_____5-7.5	_____1-2
_____7.5-10	_____2-3

_____10-15	_____3-4
_____15-25	_____4-6
_____25-35	_____6-9
_____More than 35	_____More than 9
_____None	_____None
_____Prefer not to answer	_____Prefer not to answer

Now skip to question 39

38. If you did not not use a phone, please check the primary reason why not

_____ The phone itself is too expensive (handset)
_____ There is no place near me to obtain a phone (handset)
_____ I have a family member with a phone, but he/she will not let me use it
_____ Phone calls and/or texts are too expensive
_____ There is no mobile coverage in my area
_____ I do not need to use a mobile phone
_____ I do not know how to use a mobile phone

_____Other

Section V – Household Attitudes towards ICTs

39. Do you think Internet your use of the internet/Broadband Internet is Expensive?

Circle One: Yes No Don't Know

40. If you want to use a phone, is it easy for you to obtain access to one?

Circle One: Yes No Don't Know

41. Do you think devices that enable one to use the Internet are affordable to most people you know?

Circle One: Yes No Don't Know

41.a Do you think devices that enable one to use Broadband Internet are affordable to most people you know?

Circle One: Yes No Don't Know

41. Do you agree with the statement "The Internet/Broadband Internet is Easy to Use?"

Circle One: Yes No Don't Know

42. Do you think it is easy to make money by using the Internet /Broadband Internet?

Circle One: Yes No Don't Know

42.a Do you think Broadband Internet is much faster than Internet?

Circle One: Yes No Don't Know

42.b *Do you think Internet is much faster than Broadband Internet*

Circle One: Yes No Don't Know

43. Do you agree with the statement "when I want to find information, the Internet/Broadband Internet is almost always helpful"?

Circle One: Yes No Don't Know

44. Do you think your use of Internet/Broadband Internet will be cost less in the future?

Circle One: Yes No Don't Know

45. Do you think the government does enough to promote the use Broadband Internet?

Circle One: Yes No Don't Know

46. Do you think the government does enough to promote the use of the Internet?

Circle One: Yes No Don't Know

47. Of the following, what do you think it the biggest challenge of getting Internet access/Broadband Internet?

_____ Obtaining access to a device that uses the Internet/Broadband
_____ Finding network access
_____ lack of electricity
_____ Cost of Service
_____ Other (specify) _____

48. What would make you use the Internet/Broadband Internet more (select only one)?

_____If download/upload speeds were faster
_____If data use was less expensive
_____If it was easier to access an Internet connection
_____If you better understood how to use it
_____Availability of local content
_____Other (specify)_____

Part VI – Information Needs Assessment

Could you indicate:

- How important the following types of information are for you in general?

(code a: 0 = Not applicable; 1 = unimportant; 2 = not very important; 3= no opinion; 4= important; 5 = very important)

- Which means you most commonly used to access or share each type of information?

code b: Not applicable……0
Face to face contact……1
radio…… 2
TV……3
Newspaper / newsletter……4
local information centre…..5
phone…… 6
internet ……7
Broadband Internet
Letters……8

- How often do you make use of each type of information?

(code a: 0 = Never / N/A; 1 = rarely (annual); 2 = occasionally(monthly) 3= often (daily / weekly)

- What degree of confidence do you have in the reliability and accuracy of the information you receive?

(code a: 0 = N/A; 1 = very low; 2 = low; 3=no opinion; 4=high; 5 = very high

(Read options and write in code that represents the respondents' opinion re: each issue)

	Importance (code a)	Means of accessing (code b)	Frequency of access (code c)	Confidence in information (code d)
Economic activities				
Market information e.g. market prices, new markets				
Availability and costs of inputs to purchase				
Information on new products e.g. pesticides, seeds				
Availability of credit & other financial services				
Crop management				
Livestock management & health				
Weather information				

Government				
Government and legal requirements (e.g. taxes, regulations)				
Government policies				
Availability of subsidies & grants				
How government and democracy work				
Education				
Education & training opportunities				
Business skills				
Health				
How to prevent and treat illness within the family				
Health issues e.g. HIV/AIDS				
Social / domestic				
Urgent e.g. emergencies, deaths				
Information about friends and family members				
Remittances				
Others				
News (local and international)				
Sport				
Travel e.g. driver schedules, trains				
Women's rights and support				