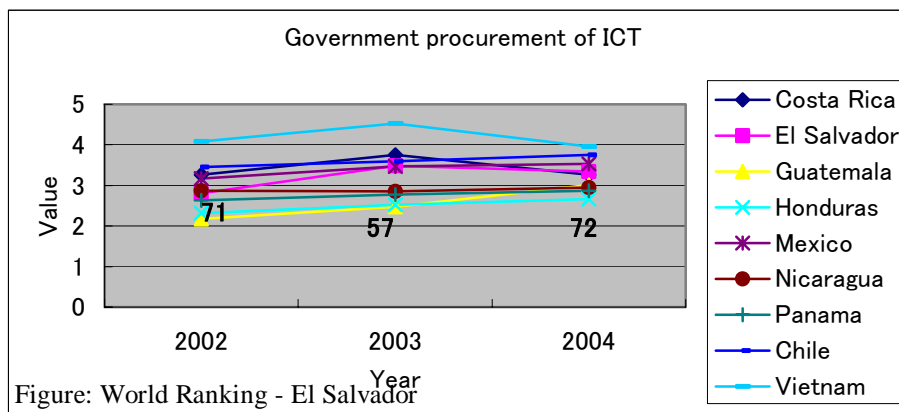
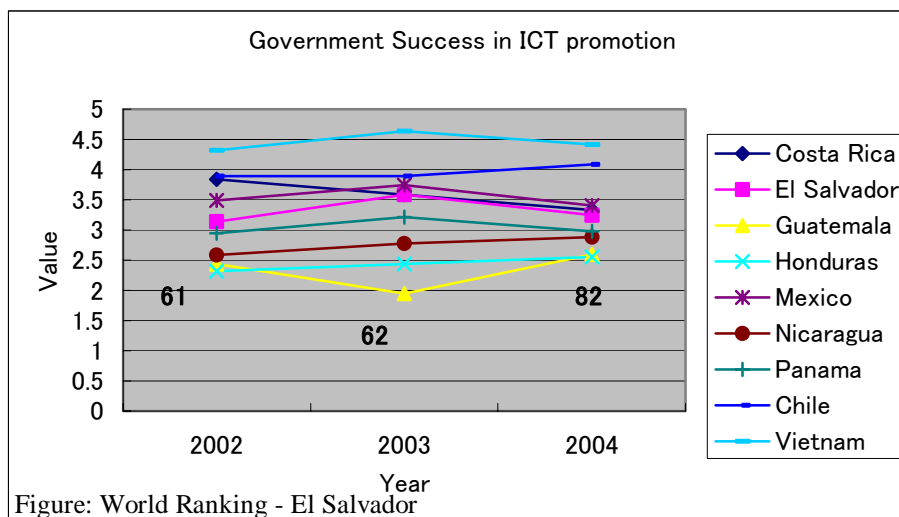
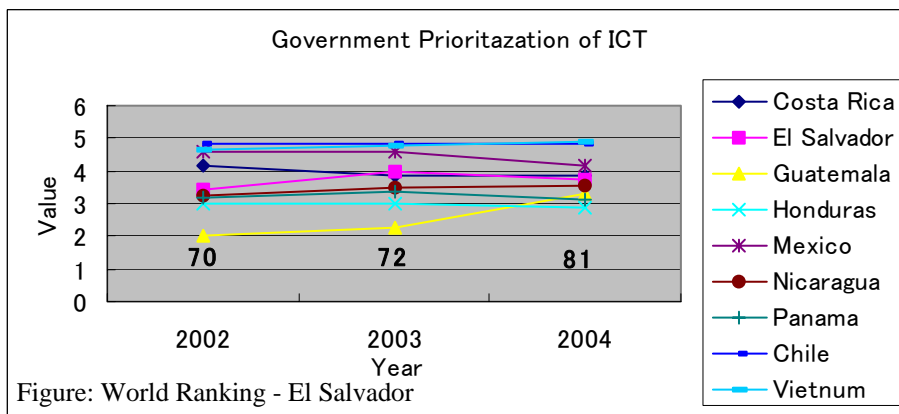


## Chapter 4 ICT Use in the Government

### 4.1 ICT Use in the Government

There are some indicators related to e-Government, its readiness and usage. Despite the efforts toward e-Government, El Salvador cannot be considered as emphasizing e-Government.



Source: The Global Information Technology Report

Figure 4.1 Indicators in Government ICT Use

There are roughly 10,000 persons in the central government ministries and agencies. It is estimated that among them, 300 to 500 persons are ICT personnel including software development and technical support. Looking at the ministries, the Ministry of Finance and the National Registration Center have a large number of IT staff. Except these, the maximum number of IT staff in an organization is 20, with which it is very difficult to deploy the necessary ICT technology to internally design, develop, operate, and maintain, as well as to catch up with new technologies internally.

Basically, application development is done by internal staff with external resources to make up for any lack of resources (and technique). According to our interviews, only the Ministry of Public Works mainly uses outsourcing for their development tasks.

Most central ministries and agencies have their application systems for internal control, data management, and services for citizens, for which only a few exist. Each ministry or agency expands its systems into its regional offices. Inter-organizational application is limited to SAFI only which serves as ASP and supports accounting, budgeting and payroll.

As a sample of municipalities (there are 262 municipalities), Santa Tecla and Antigua Cuscatlan were selected. Both are parts of La Libertad province, the population of which is 804 thousand.

Antigua Cuscatlan municipality has 1,200 staff, of which 5 are ICT personnel. Santa Tecla has 9 ICT personnel among the staff of 750.

**Table 4.1 Number of Staff per Agency**

Institution	Number of personnel
Central Reserve Bank	436
General Superintendence of Electricity and Telecommunications	92
Legislative Assembly	N.A.
Ministry of Agriculture and Livestock	1,500
Ministry of Economy	350
Ministry of Education	36,050
Ministry of Environment and Natural Resources	250
Ministry of Finance	N.A.
Ministry of Foreign Affairs	798
Ministry of Internal Affairs	N.A.
Ministry of Labor and Social Prevision	N.A.
Ministry of National Defense	N.A.
Ministry of Public Health and Social Assistance	18,000
Ministry of Public Works	1,000
National Registration Center	1,587
Superintendence of the Financial System	200

N.A.: Not Available to the Study Team by the end of October 2006.

Note: School teachers (Ministry of Education) and hospital personnel (Ministry of Public Health and Social Assistance) are included in the figures.

Source: JICA Study Team

**Table 4.2 Responsible Organization on ICT/Responsible Person(s)/Number of Staff**

<b>Institution</b>	<b>ICT Organization</b>	<b>ICT Personnel</b>	<b>Responsible</b>
Central Reserve Bank	IT Department	32	Ing. Ana Delmy Ponce de Corpeño
General Superintendence of Electricity and Telecommunications	IT Unit	1	Lic. Ana María Mata de Bonilla
Legislative Assembly	N.A.	N.A.	N.A.
Ministry of Agriculture and Livestock	IT Division	7	Ing. Gerardo Brizuela Coca
Ministry of Economy	IT Direction	10	Ing. Leonel Antonio Jiménez Gómez
Ministry of Education	IT National Direction	20	Ing. Luis Roberto Cruz
Ministry of Environment and Natural Resources	IT Unit	7	Francisco Romero
Ministry of Finance	Financial Administration National Direction	80	N.A.
Ministry of Foreign Affairs	IT Unit	15	Ing. Alfredo Morales
Ministry of Internal Affairs	Technologic Development	22	Ing. Guillermo Eduardo Funes
Ministry of Labor and Social Prevision	N.A.	N.A.	N.A.
Ministry of National Defense	N.A.	N.A.	N.A.
Ministry of Public Health and Social Assistance	IT Unit	9	Ing. José A. Benjamín Arias
Ministry of Public Works	Institutional IT Unit	14	Manuel Atilio López
National Registration Center	IT Direction	100	Ing. Carlos José Hurtado
Superintendence of the Financial System	IT Direction	15	Lic. Ivette de Díaz
Supreme Court of Justice	N.A.	N.A.	N.A.
General Superintendence of Electricity and Telecommunications	SIGET	4	Mr. Bonilla

N.A.: Not Available to the Study Team by the end of October 2006.  
Source: JICA Study Team

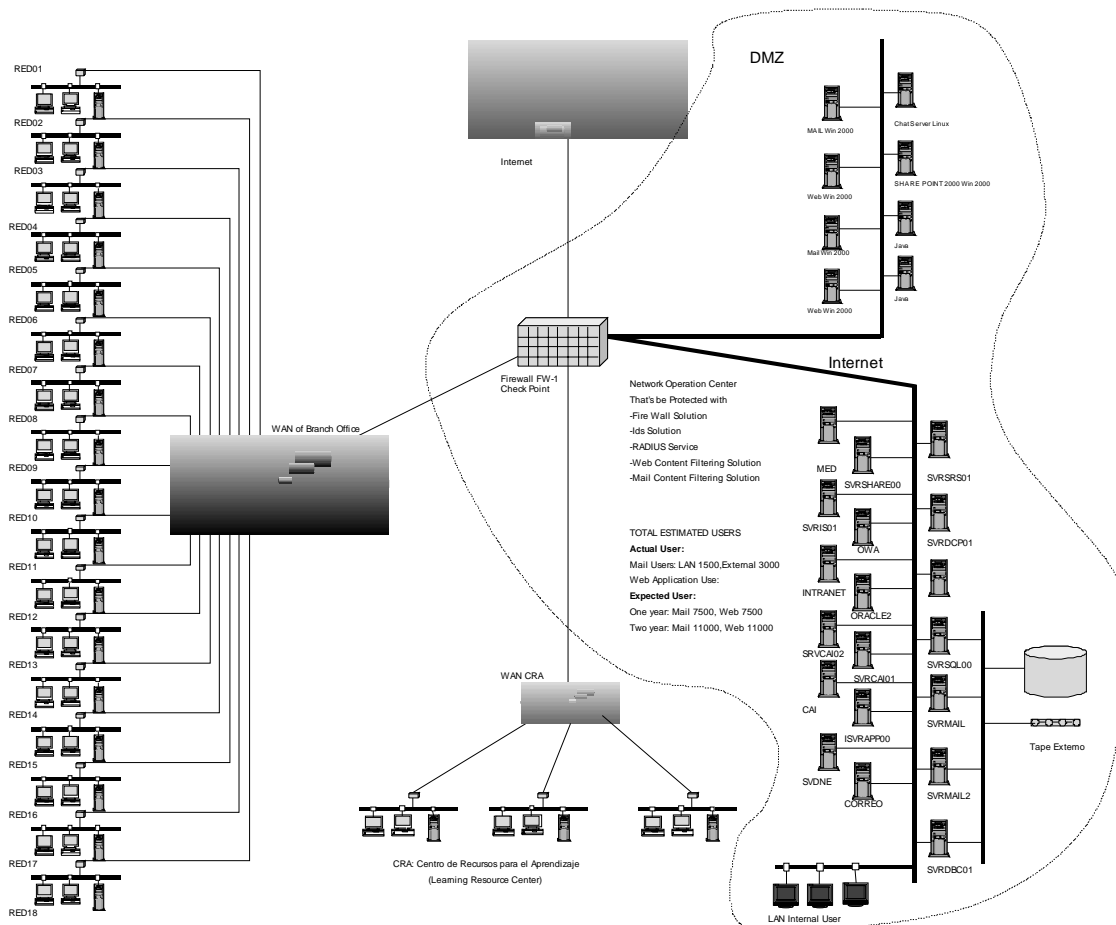
**Table 4.3 Systems and Applications Development**

<b>Institution</b>	<b>Internal development</b>	<b>Outsourced development</b>
Central Reserve Bank	Yes	No
General Superintendence of Electricity and Telecommunications	Yes	Yes
Legislative Assembly	N.A.	N.A.
Ministry of Agriculture and Livestock	Yes	Yes
Ministry of Economy	Yes	Yes
Ministry of Education	Yes	Yes
Ministry of Environment and Natural Resources	Yes	Yes
Ministry of Finance	Yes	Yes
Ministry of Foreign Affairs	Yes	Yes
Ministry of Internal Affairs	Yes	No
Ministry of Labor and Social Prevision	N.A.	N.A.
Ministry of National Defense	N.A.	N.A.
Ministry of Public Health and Social Assistance	Yes	No
Ministry of Public Works	No	Yes
National Registration Center	Yes	No
Superintendence of the Financial System	Yes	Yes
Supreme Court of Justice	N.A.	N.A.

N.A.: Not Available to the Study Team by the end of October 2006.  
Source: JICA Study Team

## 4.2 Connectivity

Every system looks good and effective, but it may not be efficient enough as the total government system. There are hardly any technical standard methodologies and guidelines among ICT departments of the ministries. No collaboration has been discussed. The following network diagram shows the consequence of independent ministerial arrangement.



Source: Plafker and Ward, 1992.

**Figure 4.2 Typical Network Diagram of a Salvador Government Organization**

Although a first glance of this network diagram does not detect any problem, each of communication lines to both other ministries and local government offices may be duplicated with other ministry's network. All ministry networks can share common communication lines each other. It is possible to dramatically reduce duplicated line cost. It is also expected to realize quicker e-Government service response if higher volume bandwidth line is used. It is also commented that both network security control and robust back up functions are poor due to lack of either budget or specialized professional resources.

Network connection situation including configuration, capacity, and internet usage by ministry are shown in tables following.

**Table 4.4 Conditions, Configurations and Capacities of Network Connection with Local Branch Office or Related Agency/Organization**

<b>Ministry/Agency</b>	<b>Network</b>
Central Reserve Bank	Two buildings, with a single LAN network and linked with optical fiber. The LAN is configured in a bus-star topology, and has a system of central switches that connect each building. It is connected with other government institutions and the financial system, through suppliers of data connectivity within a private network. It has physical connections with Superintendence of the Financial System, of Securities, of Pension Funds and Fosafi.
General Superintendence of Electricity and Telecommunications	Institutional network with wiring category 5 and 5e, with a central switch to which they all connect in cascade advanced hubs, which will be replaced by true switches this year.
Legislative Assembly	N.A.
Ministry of Agriculture and Livestock	A star type network type connected to optical fiber, at a speed of 100 Mbps.
Ministry of Economy	It does not exist any networking for agencies, branches or decentralized offices with the central offices that belong to the Ministry of Economy. The existing connections with other organizations are the following ones: Ministry of Finance, by means of antennas and dedicated connections. It is expected within 3 months to suppress the antennas and to use solely the dedicated connection that the Ministry of Finance provides. National Centre of Registration, by means of antennas, is expected to replace it by 128 Mbps dedicated connection in the next 3 months.
Ministry of Education	The conditions of the institutional network connection of main building with the 14 departmental directions and other decentralized units (4) are accomplished by IP connections provided by a local Telco. The connections have a bandwidth of 256 kbps; making a total of 18,256 kbps dedicated Links.
Ministry of Environment and Natural Resources	Connection with the regional office in La Unión through VPN
Ministry of Finance	Connection with the governmental offices of the financial area through a MAN network with Ethernet technology of 10 Mbps. Connection with others by means of 384 kbps IP network. Connection with Customs Direction office by 8 GBps Optic Fiber link.
Ministry of Foreign Affairs	At branch office: a star Ethernet LAN network, optical fiber connect the buildings (not a ring). The speed of the network is 10/100 and a large amount of hubs are used. Main office: Ethernet network. Also a 10MB MAN between the branch office, the main office (San Benito) and the General Direction of Migration and Foreign division.
Ministry of Internal Affairs	The network that is used is of two types: UTP and Optical fiber. It is a primary star distribution from the server to each switch at the different levels (Fiber). The secondary distribution is also a star from the switch to each one of the PC (UTP). The connections with other dependencies are made with optical fiber. The data links between the central offices and the regional branches are made through different means, fiber, copper, radio links, and microwave, and the speed of connection is between 512 and 1,024 kbps.
Ministry of Labor and Social Prevision	N.A.
Ministry of National Defense	N.A.
Ministry of Public Health and Social Assistance	Configuration for VPN connections (2 Mbps) at central offices and 256 kbps for hospitals.

Ministry/Agency	Network
Ministry of Public Works	80% Certified structured Cat 5 Network. 20% provisional network
National Registration Center	100 Mb LAN for the end user and 1Gb for servers, with structured wiring category 5e. WAN with two 512 MB dedicated IP redundant links, each one in departmental offices, and 1 MB in central office, with CIR 1:1, symmetrical. Logical configuration of the WAN is grid, through cryptography tunnels.
Superintendence of the Financial System	Connection with the office of Public Attention and alternate site is 512kbps, by means of subcontracted infrastructure to a local ISP.

N.A.: Not Available to the Study Team by the end of October 2006.

Source: JICA Study Team

**Table 4.5 Internet Connection Capacity (Bandwidth)**

Ministry/Agency	Band Width	Provider	Connection type
Central Reserve Bank	512 kbps	Americatel	Dedicated
	512 kbps	Newcom	Dedicated
General Superintendence of Electricity and Telecommunications	2 Mbps	Telecom	Fiber
	256 kbps	Salnet	Copper
	256 kbps	Telefónica	Fiber
Legislative Assembly	N.A.	N.A.	N.A.
Ministry of Agriculture and Livestock	1.2 Mbps	Intercom	Dedicated
Ministry of Economy	2Mbps (Main office) 512kbps (Digestyc)	Telecom	Copper
Ministry of Education	7 Mbps	Telecom	Dedicated with redundancy and 3:1 compression
Ministry of Environment and Natural Resources	512 kbps 256 kbps	Intercom	Dedicated
Ministry of Finance	8 Mbps	Telecom	Dedicated
Ministry of Foreign Affairs	2 Mbps	Telefónica	Dedicated
	2 Mbps	Telecom	Dedicated
	512 kbps	Telefónica	Dedicated
Ministry of Internal Affairs	512 kbps	Telefónica	Fiber
Ministry of Labor and Social Provision	N.A.	N.A.	N.A.
Ministry of National Defense	N.A.	N.A.	N.A.
Ministry of Public Health and Social Assistance	1 Mbps	Iconsa	Fiber
Ministry of Public Works	1 Mbps	Telemóvil	Fiber
National Registration Center	1 Mbps	Telecom	Dedicated
	512 kbps	Intercom	
Superintendence of the Financial System	1 Mbps	Gbnet	Dedicated
	128 kbps	Newcom	

N.A.: Not Available to the Study Team by the end of October 2006.

Source: JICA Study Team

## 4.3 Equipment

### 4.3.1 Hardware

#### (1) Use of PCs

There are more than 10,000 PCs in the central government offices. This means that every person in the government offices uses one PC.

There is no standardization on PCs. But some ministries/agencies have their own guidelines for the specification. For example, in the Ministry of Finance, when procuring PCs, applications are reviewed by auditing committee in terms of not only price but whether the specifications are compliant with current guidelines.

**Table 4.6 Number of PCs and Number of Servers (including Information on Individual OS)**

Ministry/Agency	Number of PCs	Windows servers	Unix /Linux servers	Other OS servers
Central Reserve Bank	484	24	4	14
General Superintendence of Electricity and Telecommunications	100	6	1	0
Legislative Assembly	N.A.	N.A.	N.A.	N.A.
Ministry of Agriculture and Livestock	500	4	4	0
Ministry of Economy	450	25	9	0
Ministry of Education	929	35	2	3
Ministry of Environment and Natural Resources	180	6	0	0
Ministry of Finance	3,000	28	12	2
Ministry of Foreign Affairs	350	13	0	0
Ministry of Internal Affairs	372	15	2	0
Ministry of Labor and Social Prevision	N.A.	N.A.	N.A.	N.A.
Ministry of National Defense	N.A.	N.A.	N.A.	N.A.
Ministry of Public Health and Social Assistance	2,200	4	0	0
Ministry of Public Works	500	7	3	0
National Registration Center	993	119	4	0
Superintendence of the Financial System	230	28	0	0

N.A.: Not Available to the Study Team by the end of October 2006.

Source: JICA Study Team

Looking at municipalities, Santa Tecla has 120 PC, and Antigua Cuscatlan has 102, equivalent to about 10% of whole personnel. Environment in municipalities is not as good as in the central government.

#### (2) Servers

There are 400 to 500 server computers in the central government. More than 80% of them are Windows servers. Purposes of these servers include application systems, database, application, web, network control, domain control, proxy, FTP, and other purposes (e-mail, document management, Intranet, development, etc).

Each ministry owns its servers even for common purposes (like network servers). Integration of these would result in higher performance and cost efficiency.

For the large scale database some organizations have already implemented SAN servers (Terra storage) and some others are planning to implement.

Municipalities have very limited environment of servers. Antigua Cuscatlan has 3 and Santa Tecla has only 1 server. There are no large scale application systems on them.

**Table 4.7 Utilization Objectives of Servers**

Ministry/Agency	Server Utilization
Central Reserve Bank	<ul style="list-style-type: none"> <li>• Data base</li> <li>• Applications</li> <li>• Contingency services</li> <li>• Data migration services</li> <li>• VPN validation</li> <li>• Management and monitoring of communication equipment and servers</li> <li>• Printing services</li> <li>• Backup services</li> <li>• Proxy server</li> <li>• Navigation content filtering</li> <li>• Domain controller</li> <li>• e-mail routing</li> <li>• DHCP, DNS, FTP, institutional mail and Internet</li> <li>• Link between Central Reserve Bank and Customs</li> <li>• Spam filtering</li> </ul>
General Superintendence of Electricity and Telecommunications	<ul style="list-style-type: none"> <li>• Domain controller (1)</li> <li>• Applications (1)</li> <li>• Data base (1)</li> <li>• e-mail (1)</li> <li>• Proxy Server and firewall (1)</li> <li>• Web (1)</li> </ul>
Legislative Assembly	N.A.
Ministry of Agriculture and Livestock	<ul style="list-style-type: none"> <li>• Oracle Data base (1)</li> <li>• Applications (2)</li> <li>• Users authentication (1)</li> <li>• e-mail (1)</li> <li>• Web site and applications (1)</li> <li>• Development (1)</li> <li>• Sybase Data base (1)</li> </ul>
Ministry of Economy	<ul style="list-style-type: none"> <li>• Domain controller (4)</li> <li>• E-mail (3)</li> <li>• Database (5)</li> <li>• Intranet (1)</li> <li>• Web (3)</li> <li>• Proxy (3)</li> <li>• Applications (3)</li> <li>• Development (4)</li> <li>• Data Storage (2)</li> <li>• Voice Server (IVR) (1)</li> <li>• Printings (1)</li> <li>• Communications (1)</li> <li>• Backup (2)</li> <li>• File Server (1)</li> </ul>
Ministry of Education	<ul style="list-style-type: none"> <li>• Windows 2003 Server</li> <li>• Data Base</li> <li>• Active directory</li> <li>• e-mail</li> <li>• Web publishing</li> <li>• Hosting</li> <li>• Applications Windows NT Server</li> <li>• Data Base Linux</li> <li>• e-mail True64</li> <li>• Data Base</li> <li>• Directory</li> <li>• Applications</li> </ul>



Ministry/Agency	Server Utilization
Ministry of Environment and Natural Resources	<ul style="list-style-type: none"> <li>• Domain controller</li> <li>• SQL Server 2000</li> <li>• Web (main site, Interactive maps and Web Mail)</li> <li>• e-mail</li> <li>• DHCP</li> <li>• DNS</li> <li>• File</li> <li>• Print</li> <li>• Intranet</li> <li>• Antivirus</li> <li>• Anti Spam</li> </ul>
Ministry of Finance	<ul style="list-style-type: none"> <li>• File</li> <li>• Network infrastructure</li> <li>• Applications</li> <li>• Development and test</li> <li>• Validation</li> <li>• Web</li> <li>• Data Base</li> </ul>
Ministry of Foreign Affairs	<ul style="list-style-type: none"> <li>• e-mail (1)</li> <li>• Antivirus and backup (1)</li> <li>• Notes applications (2)</li> <li>• Instant messaging (1)</li> <li>• Domain (DHCP, DNS) (1)</li> <li>• Monitoring and Management (1)</li> <li>• WINS, Active Directory-LDAP (1)</li> <li>• Data Base (5)</li> <li>• Printing (1)</li> <li>• Proxy (1)</li> <li>• HTTP (1)</li> </ul>
Ministry of Internal Affairs	<ul style="list-style-type: none"> <li>• Internal users domain</li> <li>• Web site and intranet publication</li> <li>• DNS</li> <li>• Data Base</li> <li>• Application development</li> <li>• Proxy</li> <li>• Passport emission and migration control</li> </ul>
Ministry of Labor and Social Prevision	N.A.
Ministry of National Defense	N.A.
Ministry of Public Health and Social Assistance	<ul style="list-style-type: none"> <li>• Web</li> <li>• e-mail</li> <li>• Data Base</li> <li>• FTP</li> <li>• Security</li> <li>• Development</li> </ul>
Ministry of Public Works	<ul style="list-style-type: none"> <li>• Web</li> <li>• e-Mail</li> <li>• Intranet</li> <li>• Antivirus</li> <li>• Proxy</li> <li>• Maps</li> <li>• Applications (Production)</li> <li>• File</li> <li>• Backup</li> <li>• DNS</li> <li>• Work Server for programmers</li> </ul>

Ministry/Agency	Server Utilization
National Registration Center	<ul style="list-style-type: none"> <li>• File server</li> <li>• Data base</li> <li>• Images</li> <li>• Maps</li> </ul>
Superintendence of the Financial System	<ul style="list-style-type: none"> <li>• Domain controllers, e-mail, antivirus (4)</li> <li>• Transactional Data base, production and development (2)</li> <li>• Institutional Data warehouse (2)</li> <li>• Web site and services to supervised institutions (6)</li> <li>• Information security (5)</li> <li>• Information exchange with related institutions (1)</li> <li>• Backup (1)</li> <li>• Technical support tool (1)</li> <li>• Institutional portal (1)</li> <li>• File servers (2)</li> <li>• Document control (2)</li> <li>• System development (1)</li> </ul>

N.A.: Not Available to the Study Team by the end of October 2006.

Source: JICA Study Team

### (3) Sites of Server Installation

Servers are located in computer rooms in each organization. Some organizations have their own computer rooms. Most of them are not under earthquake-proof condition. Only a few ministries answered that they have disaster prevention environment. Ministry of Finance and Superintendence of the Financial System have a back-up center (when a disaster occurs in the area where the primary sites are located, systems can be run in the back-up sites instead of the primary site). Few others are planning to have such back-up centers as well. All others do not have any prevention measures. There are no guidelines which tell what kind of systems and/or data should have back-up sites, how far such sites should be apart from the primary sites.

**Table 4.8 Place or Location of Server: Earthquake-proof Condition for Servers**

Ministry/Agency	Server Location (disaster prevention)
Central Reserve Bank	Own building (No)
General Superintendence of Electricity and Telecommunications	Own building (No)
Legislative Assembly	N.A.
Ministry of Agriculture and Livestock	Own building (Yes)
Ministry of Economy	Own building (No)
Ministry of Education	Own building (No)
Ministry of Environment and Natural Resources	Own building (No)
Ministry of Finance	Own building (No)
Ministry of Foreign Affairs	Own building (No)
Ministry of Internal Affairs	Own building (No)
Ministry of Labor and Social Prevision	N.A.
Ministry of National Defense	N.A.
Ministry of Public Health and Social Assistance	Own building (No)
Ministry of Public Works	Own building (No)
National Registration Center	Anti-seismic building (Yes)
Superintendence of the Financial System	Located in main building of the SFS. As a contingency, one copy is kept in the customer assistance office and another copy is sent to a safe box in a local bank. (Yes)

N.A.: Not Available to the Study Team by the end of October 2006.

Source: JICA Study Team

### 4.3.2 Operations and Maintenance

IT unit in each ministry is responsible for the operation and maintenance of their own computer facilities, network facilities and software including application systems. Operation rules are according to the method which are decided in the ministry whether it is written or not.

Data back up is executed in each ministry. Some of them move such back-up media to more secure sites, while some others keep them only in the same locations.

**Table 4.9 Backup Available for Operating Servers**

Ministry/Agency	Backup Strategy
Central Reserve Bank	Daily: Incremental Weekly, Monthly: Full Tri-monthly: OS images
General Superintendence of Electricity and Telecommunications	Autoloader tape drive with multiple tape drives
Legislative Assembly	N.A.
Ministry of Agriculture and Livestock	Tape
Ministry of Economy	Tape and DVD-RW, moved periodically to a fire and flood proof site with surveillance
Ministry of Education	Backup library and CD recorders network
Ministry of Environment and Natural Resources	Daily manual backup
Ministry of Finance	Centralized, differential thru Tivoli Storage tool
Ministry of Foreign Affaire	200-400 GB tape backup DLT. HP Openview
Ministry of Internal Affaire	Automatic backup for domain Server and e-mail. Applications and Data Base backup are executed manually.
Ministry of Labor and Social Prevision	N.A.
Ministry of National Defense	N.A.
Ministry of Public Health and Social Assistance	Tape and hard drive
Ministry of Public Works	Tape
National Registration Center	Daily incremental, daily differential and weekly full
Superintendence of the Financial System	Daily, Tape

N.A.: Not Available to the Study Team by the end of October 2006.

Source: JICA Study Team

### 4.3.3 Software

There is no standardization of the software which is used in the government. But because of the market trends, there is a tendency to utilize a few kinds of software in each category.

Server OS (Operating Systems) ---- Windows (NT server) or LINUX

Database Management Systems ---- Oracle or SQL server

Programming language ---- JAVA

Regarding JAVA, because it is an Object Oriented language, it is important for higher productivity to make the components common to be reused, and build a library to be shared by all of the government JAVA projects.

### 4.3.4 Security

Information and system security is considered and implemented into system environment by each ministry. These include Firewall for network, Antivirus, Authentication, etc. However, according to our interview results, most people are not sensitive to attacks from hackers. Some ministries are making effort to build and document security policy in the ministry. Details are shown in table following.

**Table 4.10 Conditions on Security**

Ministry/Agency	Security Conditions
Central Reserve Bank	<ul style="list-style-type: none"> <li>• Information security management is carried by the technology committee and the coordination of security of the information, based on security policies and schemes of security based on standards, mainly the BS7799, with components: IPS/IDS, tools of detection of vulnerabilities, web content filtration, antivirus system, anti Spam and firewall.</li> </ul>
General Superintendence of Electricity and Telecommunications	<ul style="list-style-type: none"> <li>• Software and hardware firewall</li> <li>• Antivirus</li> <li>• Anti spam</li> </ul>
Ministry of Agriculture and Livestock	<ul style="list-style-type: none"> <li>• Data bases security for access to the information through users and roles</li> <li>• Authentication by way of the applications</li> <li>• Daily copies of the data bases</li> <li>• Firewall</li> <li>• Physical security of servers, allowing the access to the area only to the authorized personnel</li> <li>• Anti seismic building</li> <li>• Easy handling fire extinguishers</li> </ul>
Ministry of Economy	<ul style="list-style-type: none"> <li>• Firewall in project of installation in next the two months.</li> <li>• ISA Server 2005 with defined policies of navigation as far as ports and protocols.</li> <li>• DMZ Installed</li> <li>• Antivirus with Anti spy ware in clients.</li> <li>• Mail server with antivirus and anti spam that protects the mailboxes before it arrives at the addressee</li> <li>• In FOEX: In order to enter the area of the data center, only the IT unit personnel have access</li> <li>• Conditioned air suppliers are redundant and automated; in case of absence of electrical energy they can continue working by a maximum period of two hours in case the energy plant failed.</li> </ul>
Ministry of Education	<ul style="list-style-type: none"> <li>• There is a security Nokia appliance with the Checkpoint software, with which the segmentation takes control of the different areas from servers</li> <li>• DMZ, local network, WAN network, CRA network</li> <li>• A set of policies have been created for the use of resources of information like network, PC, etc.</li> <li>• Also the norm of use of the electronic mail has been created, but has not yet been implemented</li> </ul>
Ministry of Environment and Natural Resources	<ul style="list-style-type: none"> <li>• Firewall for perimeter protection against Virus, Spam, Spy ware and IPS</li> </ul>
Ministry of Finance	<ul style="list-style-type: none"> <li>• Norms, procedures and guidelines: Policy of Security of the Information exists and at the moment the phase of implantation of the Management System of information security is on going. Everything is based on international standards, mainly ISO17799:2000, BS7799-2:2002, UNITES 71501-1:2001 IN, UNITES 71501-2:2001 IN, UNITES 71501-3:2001 IN and UNITES 71502:2004.</li> <li>• Organizational: area specialized in security of the information.</li> <li>• Physical conditions: Data processing center with preparation, electrical protection and physical control of accesses.</li> <li>• Technological conditions: Technological platform of software and hardware for the monitoring of intruders in network and servers, control of malicious software, updates of operating system, control of logical accesses to the firewall systems of network through and architecture of security of network with virtual networking of local area and demilitarized zones.</li> </ul>

Ministry/Agency	Security Conditions
Ministry of Foreign Affairs	<ul style="list-style-type: none"> <li>• There is an implemented perimeter security with Firewalls and VPN</li> <li>• Also there is a platform of antivirus and content filtration.</li> <li>• About to implant an anti spam, anti spy ware platform</li> <li>• Established a policy of update of operating system and user policies</li> <li>• They consider that the security is good.</li> </ul>
Ministry of Internal Affairs	<ul style="list-style-type: none"> <li>• There is a Firewall, an Internet access Proxy, and the security that comes with communication equipment (routers)</li> </ul>
Ministry of Public Health and Social Assistance	<ul style="list-style-type: none"> <li>• Firewall, POP3 filter and a corporate antivirus software</li> </ul>
Ministry of Public Works	<ul style="list-style-type: none"> <li>• Firewall Cisco PIX, McAfee SCM equipment for network perimeter security</li> </ul>
National Registration Center	<ul style="list-style-type: none"> <li>• Hardware firewall Nortel Network for front office to Internet, Router-switch 6513 for central LAN, Router 3640 for offices and branches access</li> </ul>
Superintendence of the Financial System	<ul style="list-style-type: none"> <li>• Department of IT Security</li> <li>• Institutional security policies</li> <li>• IT plan for contingencies</li> <li>• An alternating site in case of contingencies</li> <li>• Tools of security (hardware and software) for the protection of the workstations and the perimeter (Internet navigation, electronic mail, encryption in applications and data transfer)</li> <li>• Critical systems have redundancy schemes</li> <li>• Periodic processes of analysis of vulnerabilities in the critical systems are executed</li> </ul>
Supreme Court of Justice	N.A.

N.A.: Not Available to the Study Team by the end of October 2006.

Source: JICA Study Team

#### 4.4 Application Systems

A highlight of application system is SAFI, which is accounting, budgeting and payroll system developed by Ministry of Finance. It started in 1995, and current users of this system reach 98% of central government and 75% of others. Other than SAFI there are some institutional systems. They are developed independently, at the same time as many kinds of application systems are under utilization now as shown in the table following.

**Table 4.11 Existing Duties and Services (back-office and front-office) Utilizing ICT**

Ministry/Agency	Back-Office	Front-Office
Central Reserve Bank	<ul style="list-style-type: none"> <li>• Checking Accounts System</li> <li>• Liquidity Reserve</li> <li>• Security Titles System</li> <li>• Currency system</li> <li>• Administration of international reserves</li> <li>• Foreign trade integrated system</li> <li>• Accounting integrated system</li> <li>• Economic and financial information system</li> <li>• TEST control</li> <li>• Auxiliary countable registry</li> <li>• Real state</li> <li>• Control of physical access</li> <li>• Human resources system</li> <li>• Monitoring of the documentation of the Presidency</li> <li>• Individual account – Protection fund</li> <li>• Protection fund loans</li> <li>• Monitoring of agreements</li> <li>• Control of false currency</li> <li>• System of procuring and hiring</li> <li>• Fuel system and transport</li> <li>• Mail correspondence</li> <li>• Microfilm</li> <li>• Document quality control</li> <li>• Control of monetary species inventories</li> </ul>	N.A.
General Superintendence of Electricity and Telecommunications	<ul style="list-style-type: none"> <li>• SAFI system (connection with Ministry of Finance)</li> </ul>	<ul style="list-style-type: none"> <li>• Electrical energy quality of service system</li> <li>• Web site, including “Guide of services of SIGET”</li> <li>• Attention to the user Centre management system</li> <li>• Registry of electricity and telecommunications system</li> <li>• Payroll and attendance system</li> <li>• Consultation system “History of people, acts, contracts, resolutions and agreements of the Registry of Electricity and Telecommunications”</li> </ul>
Legislative Assembly	N.A.	N.A.
Ministry of Agriculture and Livestock	<ul style="list-style-type: none"> <li>• Administrative systems</li> <li>• Institutional planning and monitoring system</li> <li>• Information systems in farming health</li> <li>• Prices system</li> <li>• Farming statistics</li> <li>• Control of sale of forest seeds system</li> <li>• Registry of irrigants</li> </ul>	<ul style="list-style-type: none"> <li>• Intranet</li> <li>• Web sites: www.mag.gob.sv; www.agronegocios.gob.sv; www.agroelsalvador.com; and www.centa.gob.sv.</li> </ul>
Ministry of Economy	<ul style="list-style-type: none"> <li>• Fixed Asset</li> <li>• Existence of Warehouse</li> <li>• Budget and Finance (SAFI)</li> <li>• Payroll (SIRHI-MH)</li> <li>• Evaluation of Personnel</li> <li>• Control of Correspondence</li> <li>• Investor System</li> <li>• Monitoring System</li> </ul>	<ul style="list-style-type: none"> <li>• Query of Customs Duties of Central America.</li> <li>• Query of Imports and Exports.</li> <li>• Control of files to Administer the Law to Regulate the Deposit and Transport of Petroleum Products.</li> <li>• Control of Exploration Licenses and Concessions of the Exploitation of Mines and Canters.</li> </ul>

Ministry/Agency	Back-Office	Front-Office
	<ul style="list-style-type: none"> <li>• 6% Reimbursement System</li> <li>• Incentive System</li> <li>• Free Zone System.</li> <li>• Consumer Price Index (CPI)</li> <li>• Multiple Purpose Household Survey(MPHS) *</li> <li>• SCN68 and SCN93 Surveys.*</li> <li>• Monthly Economic Surveys.*</li> <li>• Quarterly Economic Surveys.*</li> <li>• Vital Statistics.</li> <li>• Financial Indicators (60%).</li> </ul> <p>*Data Administration and Capturing System.</p>	<ul style="list-style-type: none"> <li>• Information of Texts of negotiated or ongoing Free Trade Agreements.</li> <li>• Intelligence System for the Competitive Development of Companies.</li> <li>• Consult to the CPI</li> <li>• Consult of Population Projections</li> <li>• Agricultural, demographic, economic, labor, cultural and judicial statistics.</li> </ul>
Ministry of Education	<ul style="list-style-type: none"> <li>• Institutional correspondence system</li> <li>• Judicial embargoes system</li> <li>• Registry and Authentication of Titles of Education</li> <li>• Teachers Examining Court information system</li> <li>• Legal System</li> <li>• Infrastructure system</li> <li>• Scholastic Accreditation System</li> <li>• Scholarships System</li> <li>• Projects Management system</li> <li>• Management system</li> </ul>	<ul style="list-style-type: none"> <li>• Customer assistance system</li> <li>• Local scholastic management system</li> <li>• Academic registry</li> <li>• Human resources</li> <li>• Institutional educative project</li> <li>• Finances</li> <li>• Preventive maintenance</li> <li>• Warehouse</li> <li>• Procuring</li> <li>• Socioeconomic surroundings</li> </ul>
Ministry of Environment and Natural Resources	<ul style="list-style-type: none"> <li>• Environmental evaluation system</li> <li>• Contamination monitoring system</li> <li>• Human resources system</li> </ul>	<ul style="list-style-type: none"> <li>• Environmental denunciations system</li> </ul>
Ministry of Finance	<ul style="list-style-type: none"> <li>• Tools for systems analysis &amp; design and programming of application</li> <li>• Development and maintenance of applications SAFI - SIRH oriented to the public sector</li> </ul>	<ul style="list-style-type: none"> <li>• Hosting with resources of applications servers and Data bases</li> <li>• Users management for accessing the network</li> <li>• Services: Access to Internet, Communications connections, Electronic mail, Antivirus, Telephony, Voice and data network</li> </ul>
Ministry of Foreign Affairs	<ul style="list-style-type: none"> <li>• SAFI (Ministry of Finance integrated system)</li> <li>• Intranet</li> <li>• International cooperation projects accounting system</li> </ul>	<ul style="list-style-type: none"> <li>• www.rree.gob.sv</li> <li>• Passport emission system</li> </ul>
Ministry of Internal Affairs	<ul style="list-style-type: none"> <li>• Migratory control</li> </ul>	<ul style="list-style-type: none"> <li>• Passport emission system</li> </ul>
Ministry of Labor and Social Prevision	N.A.	N.A.
Ministry of National Defense	N.A.	N.A.
Ministry of Public Health and Social Assistance	<ul style="list-style-type: none"> <li>• Epidemiologist Monitoring system at the central level</li> <li>• Morbi-mortality on line system</li> </ul>	<ul style="list-style-type: none"> <li>• Filling of forms for capture of information at hospital level</li> <li>• Other applications in DOS (Provisions inventory, National statistics information system, Management information system, Prenatal system, Family Planning system)</li> </ul>
Ministry of Public Works	N.A.	N.A.
National Registration Center	N.A.	<ul style="list-style-type: none"> <li>• Norton Enterprise Edition (Web Security, Mail Security)</li> <li>• ISA Server</li> </ul>
Superintendence of the Financial System	<ul style="list-style-type: none"> <li>• Integrated system of Administration and Finances (payroll, accounting, budget,</li> </ul>	<ul style="list-style-type: none"> <li>• Institutional Web site</li> <li>• Risks central</li> </ul>

Ministry/Agency	Back-Office	Front-Office
	fixed assets, bank) <ul style="list-style-type: none"> <li>• Document Control and General archives system</li> <li>• Procuring and warehouse system</li> <li>• Evaluation of performance system</li> <li>• Analysis of Cubes system</li> <li>• Library on line</li> <li>• Institutional portal</li> </ul>	<ul style="list-style-type: none"> <li>• Related People</li> <li>• Public Registry of Shareholders system</li> <li>• Statistical accountant of Banks, Insurance, and non Banks</li> <li>• Early Alert System</li> <li>• Statistical Bulletins</li> <li>• Insurances Yearbook</li> <li>• Liquidity Reserve</li> <li>• Data analysis system</li> <li>• Institutional records</li> <li>• Boards of directors</li> <li>• Economic Groups</li> <li>• Consultation of Indebted</li> <li>• Shipments information system</li> <li>• Virtual Library (catalogue of books and publications of the SFS)</li> </ul>

N.A.: Not Available to the Study Team by the end of October 2006.

Source: JICA Study Team

**Table 4.12 Planned Systems and Applications to be Developed and Sources of Funding**

Ministry/Agency	Planned System/ Application	Status	Funding Source
Central Reserve Bank	(1) Electronic system of high value payments	Under development	Own funds
	(2) Interest rates	Under development	Own funds
	(3) Catalogue Adoption of system National accounts	Under development	Own funds
	(4) Administration of liquidity reserve	Under development	Own funds
	(5) Monitor of the financial system	Under development	Own funds
General Superintendence of Electricity and Telecommunications	(1) Institutional Intranet	In implementation	Own funds
	(2) Requests and updates of frequencies of telecommunications	Under development	Own funds
	(3) Inscription of Frequencies in the Registry of Electricity and Telecommunications	Offer evaluation	Own funds
	(4) Management information system	Planned	Own funds
	(5) Module for the registry of telecommunications equipment	Planned	Own funds
	(6) Registry system, including Internet facilities	Planned	Own funds
	(7) Invoicing and collections	Planned	Own funds
	(8) Requests of certifications of the registry of Electricity and Telecommunications, with electronic payment	Planned	Own funds
	(9) Consultation of frequencies available thru institutional site	Planned	Own funds
	(10) Intranet with remote access	Planned	Own funds
	(11) New system of audit of Invoicing of the electrical service	Planned	Own funds
	(12) Assets control of the distributors of electrical energy system	Planned	Own funds



Ministry/Agency	Planned System/ Application	Status	Funding Source
Legislative Assembly	N.A.	N.A.	N.A.
Ministry of Agriculture and Livestock	(1) Modernization of Cendepesca	Request	IDB
	(2) Modernization of Surveys	Execution	USAID
	(3) Extension of the Register of irrigants	Request	IDB
	(4) Web site	Execution	Own funds
	(5) Administrative Systems	Maintenance	Own funds
	(6) Geographic information system	Maintenance	No funding
	(7) Control of Artisan Fishing	Maintenance	No funding
	(8) System of Permissions for irrigants	Maintenance	No funding
	(9) Center of Qualification	Maintenance	No funding
Ministry of Economy	(1) Intranet	Development	GOES and Own Resources
	(2) Institutional Website	Planning	GOES
	(3) Extranet	Development	GOES and Own Resources
	(4) Emission of Licenses and Control of Export Quotas under a Free Trade Agreement	Development	Own Resources
	(5) System for the Administration of International Cooperation for the Preparation of the Strengthening of the Participation of the PYMES in DR-CAFTA	Development	Japanese Donation, TF-055
	(6) Restructure the Commercial Balance System	Planning	GOES
	(7) Investors System	Planning	GOES
	(8) System of emission of solvencies of statistical registry, for the registration of commerce and industry	Development	GOES
	(9) Data Warehouse of Census and Economic Directories	Execution	GOES
	(10) Data Warehouse of Population and Housing Census	Planning	GOES, UNFPA, IDB
	(11) Data Warehouse of Agricultural Census	Planning	GOES
	(12) Data Warehouse of the National Survey of Household Income and Expenses	Planning	GOES – Swedish Cooperation
	(13) Census Cartography	Development	GOES – JICA
	(14) Data Warehouse of the Multiple Purpose Household Survey	Planning	GOES
	(15) Data Warehouse of the Quarterly Economic Surveys	Development	GOES
Ministry of Education	(1) System of matriculation EDUCAME	Under development	GOES
	(2) System of Necessities of High School Education 2006	In planning	GOES
	(3) System of Magisterial Welfare	Under development	GOES
	(4) System of food Control of the 2006 program	In planning	GOES
	(5) System of Book Fairs	In planning	GOES
	(6) System of Education Statistics	Census	IDB
Ministry of Environment and Natural Resources	(1) System of Monitoring de Hydro Resources	Under development	European Union
	(2) Hydro Observatory	Analysis	UNDP

Ministry/Agency	Planned System/ Application	Status	Funding Source
	(3) New institutional Web site	Under development	AECI/EU
Ministry of Finance	(1) COMPRASAL	Under development	World bank
Ministry of Foreign Affairs	(1) Provisional passport emission system	Under development	GOES-USA
Ministry of Internal Affairs	(1) Change of platform for passport emission technology	Call for offers	GOES
Ministry of Labor and Social Prevision	N.A.	N.A.	N.A.
Ministry of National Defense	N.A.	N.A.	N.A.
Ministry of Public Health and Social Assistance	(1) Program of Support to the Modernization	Under development	IDB
Ministry of Public Works	(1) SAFI PLUS	Under development	IDB
	(2) Housing program phase 1	TOR	IDB
	(3) Management of Internal Audit	Call for offers	GOES
	(4) Integral Control panel	Call for offers	GOES
	(5) Unique Window	TOR	Undefined
	(6) Management of Quality in Information technology	TOR	Undefined
	(7) Geographical information system	TOR	Undefined
	(8) Auto evaluation of technical standards of Internal control	Call for offers	GOES
National Registration Center	(1) Infrastructure of spatial data	Design	Own funds
	(2) Postal Code	Design	Own funds
	(3) Consultation service in Web	Design	Own funds
Superintendence of the Financial System	(1) Redesign of the Verifying and Receiving System – Risks Central	In process	Own funds
	(2) Financial indicators of projected financial charts	In process	Own funds
	(3) Standard NPB3-11 Liquid asset	In process	Own funds
	(4) Models of conglomerates analysis (BOPEC)	About to start	Own funds
	(5) Models of Financial Analysis (CARMEL)	In process	Own funds
	(6) Patrimonial fund at consolidated level	About to start	Own funds
	(7) Model of Analysis for other Institutions (Credit officers)	About to start	Own funds
	(8) Mathematical Model of Value in Risk	About to start	Own funds
	(9) Capture of financial tables of the Real Sector	In process	Own funds
	(10) Risk questionnaire	About to start	Own funds
	(11) Audit worksheets	About to start	Own funds
	(12) Related indebted at group level	About to start	Own funds
	(13) Moor evaluation	In process	Own funds
	(14) Integral audits automatization	About to start	Own funds
	(15) Mapping of Financial Conglomerates and Economic Groups	About to start	Own funds
	(16) Partners and Shareholders for IFNB	In process	Own funds
	(17) Indebted Web Services for Consultation	About to start	Own funds
	(18) Rates, commissions and surcharges	About to start	Own funds

Ministry/Agency	Planned System/ Application	Status	Funding Source
	(19) COES system for the reception of the countable information of the societies at individual level and consolidated level	About to start	Own funds
	(20) Extraordinary assets	About to start	Own funds
	(21) Agencies and branches	About to start	Own funds
	(22) Integrated system to analyze data	About to start	Own funds
	(23) Financial information Center (CIF)	Call for offers	IDB
	(24) Institutional integrated portal (SSF, SV and SP)	Call for offers	IDB
	(25) Work flow	About to start	IDB
	(26) Automatization of audit In Situ	About to start	IDB
	(27) Prime product capture	About to start	Own funds
	(28) Suspicious Operations	In process	Own funds
	(29) American Embassy Project	About to start	Own funds
	(30) Valuation of investments	In process	Own funds

N.A.: Not Available to the Study Team by the end of October 2006.

Source: JICA Study Team

In addition to existing systems, many are also under planning as shown on Table 4.12. Many of these are funded by international donors.

Application systems in municipalities are very limited. SAFIMU which is developed by Ministry of Finance is developed is penetrated roughly 75% of all municipalities as ASP.

#### 4.5 Services under ICT

Most of the ministries/agencies (at least all of the ministries) have their own web sites, though they are not integrated among ministries. On these sites, they are providing various kinds of information like general information of ministry role and services, procedure of applying to ministries and statistic data, etc as seen in Table below.

As of this date, there are 161 domain names registered under the second level domain gov.sv, pertaining to the services and information provided by local and central governments. Although many of them are not in use, as indicated by the Not On Line legend in the table below, there are several, on the other hand, that offer useful information to citizens. There is an informal evaluation, made specially for this study, according to the quality and quantity of the information and services provided in each site.

**Table 4.13 Web Pages and/or Services Provided by Ministries and Agencies**

No.	Web Site	Sponsor (Supporting Entity)	Dependency	Evaluation
1	<a href="http://www.aac.gob.sv">www.aac.gob.sv</a>	Civil Aviation Authority of El Salvador	Autonomous	Very good
2	<a href="http://www.academiadiplomatica.gob.sv">www.academiadiplomatica.gob.sv</a>	Not on line		
3	<a href="http://www.acajutla.gob.sv">www.acajutla.gob.sv</a>	Majorship of Acajutla	Autonomous	Good
4	<a href="http://www.aduana.gob.sv">www.aduana.gob.sv</a>	El Salvador Customs	Ministry de Finance	Very good
5	<a href="http://www.aeropuertoelsalvador.gob.sv">www.aeropuertoelsalvador.gob.sv</a>	El Salvador Airports	Ports Autonomous Executive Commission	Very good
6	<a href="http://www.aeropuertoilopango.gob.sv">www.aeropuertoilopango.gob.sv</a>	Not on line		
7	<a href="http://www.agn.gob.sv">www.agn.gob.sv</a>	Not on line		
8	<a href="http://www.agronegocios.gob.sv">www.agronegocios.gob.sv</a>	Ministry of Agriculture y Livestock	Ministry of Agriculture and Livestock	Very good
9	<a href="http://www.alcaldiadesanvicente.gob.sv">www.alcaldiadesanvicente.gob.sv</a>	Majorship of San Vicente	Autonomous	Under construction
10	<a href="http://www.alcaldiasanmiguel.gob.sv">www.alcaldiasanmiguel.gob.sv</a>	Majorship of San Miguel	Autonomous	Good
11	<a href="http://www.alegria.gob.sv">www.alegria.gob.sv</a>	Majorship of Alegría	Autonomous	Good
12	<a href="http://www.amp.gob.sv">www.amp.gob.sv</a>	Marine Ports Authority	Autonomous	Good
13	<a href="http://www.amss.gob.sv">www.amss.gob.sv</a>	Majorship of San Salvador	Autonomous	Very good
14	<a href="http://www.amst.gob.sv">www.amst.gob.sv</a>	Not On line		
15	<a href="http://www.anda.gob.sv">www.anda.gob.sv</a>	National Administration of Aqueducts and Sewage systems	Autonomous	Good
16	<a href="http://www.ansp.gob.sv">www.ansp.gob.sv</a>	National Administration of Public Security	Ministry of Internal Affairs	Good
17	<a href="http://www.antiguocusatlan.gob.sv">www.antiguocusatlan.gob.sv</a>	Not on line		
18	<a href="http://www.asamblea.gob.sv">www.asamblea.gob.sv</a>	Legislative Assembly	Autonomous	Good
19	<a href="http://www.bcr.gob.sv">www.bcr.gob.sv</a>	Central Reserve Bank	Autonomous	Good
20	<a href="http://www.bfa.gob.sv">www.bfa.gob.sv</a>	Not on line		
21	<a href="http://www.bgfa.gob.sv">www.bgfa.gob.sv</a>	Armed Forces General Library	Ministry of Defense	Good
22	<a href="http://www.binaes.gob.sv">www.binaes.gob.sv</a>	National Library of El Salvador	CONCULTURA - Ministry of Education	Good
23	<a href="http://www.bmi.gob.sv">www.bmi.gob.sv</a>	Investment Multisectorial Bank	Semi Autonomous	Very good
24	<a href="http://www.cafta.gob.sv">www.cafta.gob.sv</a>	El Salvador-USA Free Trade Agreement	Ministry of Economy	Very good
25	<a href="http://www.cajamined.gob.sv">www.cajamined.gob.sv</a>	Mutual Treasury of MINED employees	Ministry of Education	Good
26	<a href="http://www.cancilleria.gob.sv">www.cancilleria.gob.sv</a>	Not on line		
27	<a href="http://www.casapres.gob.sv">www.casapres.gob.sv</a>	Presidential House	Secretary of Communications of the Presidency of the Republic	Very good
28	<a href="http://www.cel.gob.sv">www.cel.gob.sv</a>	Hidroelectric Executive Commission of Lempa River	Autonomous	Very good
29	<a href="http://www.censos.gob.sv">www.censos.gob.sv</a>	Surveys of El Salvador	DIGESTYC - Ministry of Economy	Good

No.	Web Site	Sponsor (Supporting Entity)	Dependency	Evaluation
30	<a href="http://www.centa.gob.sv">www.centa.gob.sv</a>	National Center of Agropecuary and Forest Technology	Ministry of Agriculture and Livestock	Good
31	<a href="http://www.centrex.gob.sv">www.centrex.gob.sv</a>	Export Proceedings Center	Central Reserve Bank	Very good
32	<a href="http://www.cepa.gob.sv">www.cepa.gob.sv</a>	Autonomous Ports Executive Commission	Autonomous	Under construction
33	<a href="http://www.cnj.gob.sv">www.cnj.gob.sv</a>	National Council of Judicature	Autonomous	Very good
34	<a href="http://www.cnr.gob.sv">www.cnr.gob.sv</a>	National Registry Center	Ministry of Economy	Very good
35	<a href="http://www.cnsp.gob.sv">www.cnsp.gob.sv</a>	National Council of Public Security	Presidency of the Republic	Good
36	<a href="http://www.codem.gob.sv">www.codem.gob.sv</a>	Commando of Doctrine and Military Training	Ministry of Defense	Good
37	<a href="http://www.comisiondebusqueda.gob.sv">www.comisiondebusqueda.gob.sv</a>	Interinstitutional commission of disappeared children as a result of the armed conflict in El Salvador	Ministry of External Affairs	Good
38	<a href="http://www.competi.gob.sv">www.competi.gob.sv</a>	Not on line		
39	<a href="http://www.comprasal.gob.sv">www.comprasal.gob.sv</a>	Government Procuring	Ministry of Finance	Good
40	<a href="http://www.comprassal.gob.sv">www.comprassal.gob.sv</a>	Not on line		
41	<a href="http://www.computadorasparamiescuela.gob.sv">www.computadorasparamiescuela.gob.sv</a>	Not on line		
42	<a href="http://www.comunidades.gob.sv">www.comunidades.gob.sv</a>	Communities site	Vice Ministry of Foreign Affairs for Salvadorans abroad	Very good
43	<a href="http://www.conacyt.gob.sv">www.conacyt.gob.sv</a>	National Council of Science and Technology	Ministry of Economy	Good
44	<a href="http://www.conaipd.gob.sv">www.conaipd.gob.sv</a>	National Council of Integral Attention to the person with incapacities	Presidency of the Republic	Good
45	<a href="http://www.conamype.gob.sv">www.conamype.gob.sv</a>	National Commission of the Micro and Small Enterprises	Ministry of Economy	Very good
46	<a href="http://www.concultura.gob.sv">www.concultura.gob.sv</a>	National Council for Culture and Arts	Ministry of Education	Good
47	<a href="http://www.conectate.gob.sv">www.conectate.gob.sv</a>	National Education Plan	Ministry of Education	Very good
48	<a href="http://www.consaa.gob.sv">www.consaa.gob.sv</a>	Not on line		
49	<a href="http://www.consulados.gob.sv">www.consulados.gob.sv</a>	Not on line		
50	<a href="http://www.correosalvadoreno.gob.sv">www.correosalvadoreno.gob.sv</a>	Not on line		
51	<a href="http://www.corsatur.gob.sv">www.corsatur.gob.sv</a>	Tourism Salvadoran Corporation	Ministry of Tourism	Very good
52	<a href="http://www.cortedecuentas.gob.sv">www.cortedecuentas.gob.sv</a>	Controller Court of El Salvador	Autonomous	Good
53	<a href="http://www.cpmisp.gob.sv">www.cpmisp.gob.sv</a>	Not on line		
54	<a href="http://www.csj.gob.sv">www.csj.gob.sv</a>	Supreme Court of Justice	Autonomous	Good
55	<a href="http://www.cssp.gob.sv">www.cssp.gob.sv</a>	Public Health Superior Council	Presidency of the Republic	
56	<a href="http://www.daasnf.gob.sv">www.daasnf.gob.sv</a>	Not on line		
57	<a href="http://www.dceminec.gob.sv">www.dceminec.gob.sv</a>	Not on line		
58	<a href="http://www.defensoria.gob.sv">www.defensoria.gob.sv</a>	Consumer Defense	Ministry of Economy	Good
59	<a href="http://www.denunciassiget.gob.sv">www.denunciassiget.gob.sv</a>	Not on line		
60	<a href="http://www.difes.gob.sv">www.difes.gob.sv</a>	Not on line		
61	<a href="http://www.digestyc.gob.sv">www.digestyc.gob.sv</a>	National Direction of Statistics and Census	Ministry of Economy	Good
62	<a href="http://www.dpc.gob.sv">www.dpc.gob.sv</a>	Not on line		
63	<a href="http://www.e.gob.sv">www.e.gob.sv</a>	Not on line		
64	<a href="http://www.edured.gob.sv">www.edured.gob.sv</a>	Educational Portal	Ministry of Education	Very good

No.	Web Site	Sponsor (Supporting Entity)	Dependency	Evaluation
65	<a href="http://www.egob.gob.sv">www.egob.gob.sv</a>	e-Government El Salvador	Presidency of the Republic	Good
66	<a href="http://www.egobierno.gob.sv">www.egobierno.gob.sv</a>			
67	<a href="http://www.elpaisnal.gob.sv">www.elpaisnal.gob.sv</a>	Not on line		
68	<a href="http://www.elsalvador.gob.sv">www.elsalvador.gob.sv</a>	e-Government El Salvador	Presidency of the Republic	Good
69	<a href="http://www.elsalvadorcompetitivo.gob.sv">www.elsalvadorcompetitivo.gob.sv</a>	Not on line		
70	<a href="http://www.elsalvadorturismo.gob.sv">www.elsalvadorturismo.gob.sv</a>	Tourism Salvadoran Corporation	Ministry of Tourism	
71	<a href="http://www.embajadas.gob.sv">www.embajadas.gob.sv</a>	Not on line		
72	<a href="http://www.enlaseseguro.gob.sv">www.enlaseseguro.gob.sv</a>	Secure Radio Link	Salvadoran Institute of the Social Security	Very good
73	<a href="http://www.epais.gob.sv">www.epais.gob.sv</a>	e-Government El Salvador	Presidency of the Republic	Good
74	<a href="http://www.exporta.gob.sv">www.exporta.gob.sv</a>	Promotion and Export Agency of El Salvador	Ministry of Economy	Very good
75	<a href="http://www.fenadesal.gob.sv">www.fenadesal.gob.sv</a>	National Railroads of El Salvador	Ports Autonomous Executive Commission	Good
76	<a href="http://www.fgr.gob.sv">www.fgr.gob.sv</a>	Not on line		
77	<a href="http://www.fies.gob.sv">www.fies.gob.sv</a>	International Fair of El Salvador	Semi Autonomous	Good
78	<a href="http://www.figape.gob.sv">www.figape.gob.sv</a>	Not on line		
79	<a href="http://www.fisdl.gob.sv">www.fisdl.gob.sv</a>	Social Investment Fund for the Local Development	Autonomous	Very good
80	<a href="http://www.foex.gob.sv">www.foex.gob.sv</a>	Exports Promotion Fund	Ministry of Economy	Good
81	<a href="http://www.fonaes.gob.sv">www.fonaes.gob.sv</a>	Environmental Fund of El Salvador	Semi Autonomous	Good
82	<a href="http://www.fonavipo.gob.sv">www.fonavipo.gob.sv</a>	National Fund of Popular Housing	Autonomous	Good
83	<a href="http://www.fondolisiados.gob.sv">www.fondolisiados.gob.sv</a>	Protection Fund of the disabled as a result of the Armed Conflict	Autonomous	Good
84	<a href="http://www.fosaffi.gob.sv">www.fosaffi.gob.sv</a>	Not on line		
85	<a href="http://www.fosep.gob.sv">www.fosep.gob.sv</a>	Salvadoran Fund for Reinvestment Studies	Ministry of Finance	Good
86	<a href="http://www.fosofamilia.gob.sv">www.fosofamilia.gob.sv</a>	Not on line		
87	<a href="http://www.fovia.gob.sv">www.fovia.gob.sv</a>	Not on line		
88	<a href="http://www.fsv.gob.sv">www.fsv.gob.sv</a>	Social Fund for Housing	Autonomous	Very good
89	<a href="http://www.fuerzaarmada.gob.sv">www.fuerzaarmada.gob.sv</a>	Armed Forces of El Salvador	Ministry of Defense	
90	<a href="http://www.gaisa-mspas.gob.sv">www.gaisa-mspas.gob.sv</a>	Environmental Health Management	Ministry of Public Health and Social Assistance	Good
91	<a href="http://www.gobernacion.gob.sv">www.gobernacion.gob.sv</a>	Ministry of Internal Affairs	Presidency of the Republic	Good
92	<a href="http://www.gradodigital.gob.sv">www.gradodigital.gob.sv</a>	Digital Grade	Ministry of Education	Good
93	<a href="http://www.hnm.gob.sv">www.hnm.gob.sv</a>	Maternity National Hospital	Ministry of Public Health and Social Assistance	Good
94	<a href="http://www.hospitalbloom.gob.sv">www.hospitalbloom.gob.sv</a>	Children National Hospital Benjamín Bloom	Autonomous	Good
95	<a href="http://www.igd.gob.sv">www.igd.gob.sv</a>	Institute of Guarantee of Deposits	Autonomous	Good
96	<a href="http://www.ilp.gob.sv">www.ilp.gob.sv</a>	Not on line		
97	<a href="http://www.imprentanacional.gob.sv">www.imprentanacional.gob.sv</a>	National Press	Ministry of Internal Affairs	Good
98	<a href="http://www.indes.gob.sv">www.indes.gob.sv</a>	Not on line		
99	<a href="http://www.infocyt.gob.sv">www.infocyt.gob.sv</a>	Not on line		

No.	Web Site	Sponsor (Supporting Entity)	Dependency	Evaluation
100	<a href="http://www.inpep.gob.sv">www.inpep.gob.sv</a>	National Institute of Public Employees Public Pensions	Autonomous	Good
101	<a href="http://www.insafocoop.gob.sv">www.insafocoop.gob.sv</a>	Salvadoran Institute of Cooperative Promotion	Autonomous	Good
102	<a href="http://www.integracion.gob.sv">www.integracion.gob.sv</a>	Not on line		
103	<a href="http://www.inteligencia-economica.gob.sv">www.inteligencia-economica.gob.sv</a>	Not on line		
104	<a href="http://www.interpol.gob.sv">www.interpol.gob.sv</a>	Not on line		
105	<a href="http://www.isdem.gob.sv">www.isdem.gob.sv</a>	Salvadoran Institute of Municipal Development	Autonomous	Good
106	<a href="http://www.isdemu.gob.sv">www.isdemu.gob.sv</a>	Salvadoran Institute for the Development of the Woman	Presidency of the Republic	Good
107	<a href="http://www.isna.gob.sv">www.isna.gob.sv</a>	Salvadoran Institute for Integral Development of Childhood and Adolescence	Presidency of the Republic	Good
108	<a href="http://www.isri.gob.sv">www.isri.gob.sv</a>	Salvadoran Institute of Rehabilitation of the Disabled	Autonomous	Good
109	<a href="http://www.issv.gob.sv">www.issv.gob.sv</a>	Salvadoran Institute of the Social Security	Autonomous	Good
110	<a href="http://www.ista.gob.sv">www.ista.gob.sv</a>	Salvadoran Institute of Agrarian Transformation	Ministry of Agriculture and Livestock	Under construction
111	<a href="http://www.istu.gob.sv">www.istu.gob.sv</a>	Salvadoran Institute of Tourism	Ministry of Turismo	Under construction
112	<a href="http://www.jovenes.gob.sv">www.jovenes.gob.sv</a>	Youth Secretary	Presidency of the Republic	Good
113	<a href="http://www.jurisprudencia.gob.sv">www.jurisprudencia.gob.sv</a>	Judicial Documentation Center	Supreme Court of Justice	Good
114	<a href="http://www.jve.gob.sv">www.jve.gob.sv</a>	Not on line		
115	<a href="http://www.lnb.gob.sv">www.lnb.gob.sv</a>	National Welfare Lotto	Ministry of Internal Affairs	Good
116	<a href="http://www.loteria.gob.sv">www.loteria.gob.sv</a>	National Welfare Lotto	Ministry of Internal Affairs	Good
117	<a href="http://www.mag.gob.sv">www.mag.gob.sv</a>	Ministry of Agriculture and Livestock	Presidency of the Republic	Good
118	<a href="http://www.marn.gob.sv">www.marn.gob.sv</a>	Ministry of Environment and Natural B181Resources	Presidency of the Republic	Good
119	<a href="http://www.mca.gob.sv">www.mca.gob.sv</a>	Millennium Challenge Account	Presidency of the Republic	Good
120	<a href="http://www.mejicanos.gob.sv">www.mejicanos.gob.sv</a>	Majorship of Mejicanos	Autonomous	Good
121	<a href="http://www.mh.gob.sv">www.mh.gob.sv</a>	Ministry of Finance	Presidency of the Republic	Very good
122	<a href="http://www.minec.gob.sv">www.minec.gob.sv</a>	Ministry of Economy	Presidency of the Republic	Very good
123	<a href="http://www.mined.gob.sv">www.mined.gob.sv</a>	Ministry of Education	Presidency of the Republic	Very good
124	<a href="http://www.ministerioderelacionesexteriores.gob.sv">www.ministerioderelacionesexteriores.gob.sv</a>	Not on line		
125	<a href="http://www.miportal.gob.sv">www.miportal.gob.sv</a>	Not on line		
126	<a href="http://www.mitur.gob.sv">www.mitur.gob.sv</a>	Not on line		
127	<a href="http://www.mop.gob.sv">www.mop.gob.sv</a>	Ministry of Public Works	Presidency of the Republic	Good
128	<a href="http://www.morazan.gob.sv">www.morazan.gob.sv</a>	Not on line		
129	<a href="http://www.mspas.gob.sv">www.mspas.gob.sv</a>	Ministry of Public Health and Social Assistance	Presidency of the Republic	Good
130	<a href="http://www.mtps.gob.sv">www.mtps.gob.sv</a>	Ministry of Labor and Social Prevision	Presidency of the Republic	Good
131	<a href="http://www.nombredejesus.gob.sv">www.nombredejesus.gob.sv</a>	Majorship of Nombre de Jesús	Autonomous	Good

No.	Web Site	Sponsor (Supporting Entity)	Dependency	Evaluation
132	<a href="http://www.pddh.gob.sv">www.pddh.gob.sv</a>	Office of the General Judge Advocate for the Defense of Human Rights	Autonomous	Very good
133	<a href="http://www.pgr.gob.sv">www.pgr.gob.sv</a>	Office of the General Judge Advocate of the Republic	Autonomous	Very good
134	<a href="http://www.pnc.gob.sv">www.pnc.gob.sv</a>	National Civil Police	Ministry of Internal Affairs	Good
135	<a href="http://www.presidencia.gob.sv">www.presidencia.gob.sv</a>	Presidency of the Republic	Presidency of the Republic	Very good
136	<a href="http://www.phessa.gob.sv">www.phessa.gob.sv</a>	Hospitals Reconstruction Project	Ministry of Public Health and Social Assistance	Good
137	<a href="http://www.primeradama.gob.sv">www.primeradama.gob.sv</a>	National Secretary of Family	Presidency of the Republic	Good
138	<a href="http://www.progape.gob.sv">www.progape.gob.sv</a>	Not on line		
139	<a href="http://www.puertoacajutla.gob.sv">www.puertoacajutla.gob.sv</a>	Port of Acajutla	Ports Autonomous Executive Commission	Good
140	<a href="http://www.puertolaunion.gob.sv">www.puertolaunion.gob.sv</a>	Not on line		
141	<a href="http://www.redempleo.gob.sv">www.redempleo.gob.sv</a>	National Job Opportunities Network	Ministry of Labor and Social Prevision	Very good
142	<a href="http://www.rnpn.gob.sv">www.rnpn.gob.sv</a>	National Registry of Natural Persons	Autonomous	Very good
143	<a href="http://www.rree.gob.sv">www.rree.gob.sv</a>	Ministry of Foreign Affairs	Presidency of the Republic	Good
144	<a href="http://www.santaana.gob.sv">www.santaana.gob.sv</a>	Majorship of Santa Ana	Autonomous	Very good
145	<a href="http://www.servicioexterior.gob.sv">www.servicioexterior.gob.sv</a>	Not on line		
146	<a href="http://www.servicios.gob.sv">www.servicios.gob.sv</a>	Government Services Guide	Technical Secretary of the Presidency	Very good
147	<a href="http://www.siget.gob.sv">www.siget.gob.sv</a>	General Superintendence of Electricity and Telecommunications	Autonomous	Good
148	<a href="http://www.sigetmail.gob.sv">www.sigetmail.gob.sv</a>	Not on line		
149	<a href="http://www.snet.gob.sv">www.snet.gob.sv</a>	National Service of Territorial Studies	Ministry of Environment and Natural Resources	Excellent
150	<a href="http://www.snf.gob.sv">www.snf.gob.sv</a>	Not on line		
151	<a href="http://www.soyapango.gob.sv">www.soyapango.gob.sv</a>	Majorship of Soyapango	Autonomous	Good
152	<a href="http://www.spensiones.gob.sv">www.spensiones.gob.sv</a>	Superintendence of Pensions	Autonomous	Very good
153	<a href="http://www.ssf.gob.sv">www.ssf.gob.sv</a>	Superintendence of the Financial System	Autonomous	Very good
154	<a href="http://www.superval.gob.sv">www.superval.gob.sv</a>	Superintendence de Securities	Autonomous	Good
155	<a href="http://www.tlcusa.gob.sv">www.tlcusa.gob.sv</a>	FTA El Salvador - USA	Ministry of Economy	Very good
156	<a href="http://www.tlcusaca.gob.sv">www.tlcusaca.gob.sv</a>	FTA El Salvador - USA	Ministry of Economy	Very good
157	<a href="http://www.tlcusa-ca.gob.sv">www.tlcusa-ca.gob.sv</a>	FTA Centroamerica - USA	Ministry of Economy	Very good
158	<a href="http://www.tlcusaelsalvador.gob.sv">www.tlcusaelsalvador.gob.sv</a>	FTA El Salvador - USA	Ministry of Economy	Very good
159	<a href="http://www.tse.gob.sv">www.tse.gob.sv</a>	Supreme Electoral Court	Autonomous	Very good
160	<a href="http://www.upiss.gob.sv">www.upiss.gob.sv</a>	Not on line		
161	<a href="http://www.ute.gob.sv">www.ute.gob.sv</a>	Not on line		

Source: SV Net and special research made for this study

Transactional services do not exist so much at this moment. Most well-known services though internet to citizens (and enterprises) is the tax payment system. It started in 2002. Currently around 10% of tax payment applications are handled through this system. E-procurement system under development will be also open to private enterprises for participating in tenders. It is not only services to private enterprises, but tools to strengthen government functionality and for transparency.



Including above, under the catch phrase “Everything thru Internet”, the government is going to expand the area of e-Services.

#### 4.6 Existing Conditions of ICT Facilities and Operation in the Government

This section shows how difficult to maintain ICT facilities in El Salvador when natural disasters are considered.

##### 4.6.1 Earthquakes in El Salvador

###### (1) Plate Tectonics of Central America

The tectonics of Central America can be described as being sandwiched between Calib Plate and Cocos Plate, the latter going under (subducting) the former in the northeastern direction. (see Figure 4.3) Because of this tectonics severe earthquakes repeatedly occurred in El Salvador as shown in Table 4.14. Photo 1 shows a bridge collapsed by the earthquake of January 13<sup>th</sup>, 2001. (see Figure 4.4) The earthquake of 1659 (Table 4.14-No.2) and the earthquake of 1917, (Table 4.14-No6) accompanied eruptions of Boqeron volcano, northwest of San Salvador. Among earthquakes with known number of casualties, San Salvador earthquake of 1986 with Magintude 5.4 (M5.4) caused 1,500, one of M7.6 on January 13<sup>th</sup>, 2001 and another of M6.5 on February 13<sup>th</sup> caused 944 and 315 respectively. The earthquake of January 13<sup>th</sup> 2001 had its epicenter at off-shore of El Salvador and with a depth of 30-60 km, with its severity expressed in Japanese scale at 5 minus to 5 plus. The severest in recent years was that of Guatemala earthquake of February 4<sup>th</sup>, 1976, which caused 22,700 deaths. The earthquake of April 16<sup>th</sup>, 1854 put San Salvador in ruins, forcing the transfer of capital to Santa Tecla.



The cross section of the subducting Cocos plate is shown.

Source: Plafker & Ward 1992

Figure 4.3 Tectonic Setting of Central America

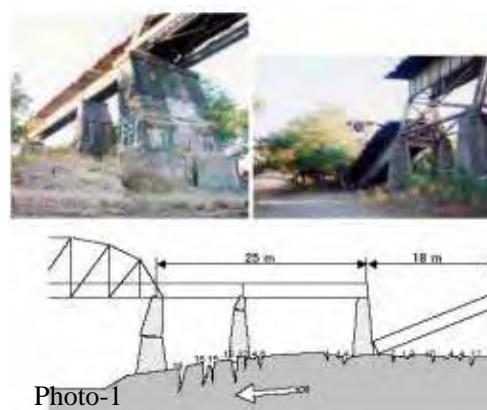


Photo-1



Source: JICA Study Team

Figure 4.4 Past Epicenters

**Table 4.14 Earthquakes in El Salvador**

No.	The outbreak date	The outbreak time (local time)	Seismic center (north latitude)	Seismic center (West longitude)	Magnitude	Seismic center depth (km)	Seismic intensity at the maximum (Revision Mel Cali seismic intensity)	Seismic center	damage	References
1	1576/5/23	-	-	-	-	-	-	From San Marcos during Santo Tomas, San Salvador	San Salvador was destroyed	Lomnitz y Schulz (1966)
2	1659/9/30	-	-	-	-	-	-	-	It is the great damage for great eruption of a Boqueron volcano in San	Lomnitz y Schulz (1966)
3	1854/4/16	-	-	-	-	-	-	The greatest seismic intensity was neighborhood of San Jacinto, San Salvador	San Salvador became the ruins, and the capital moved to Santa Tecla.	Lomnitz y Schulz (1966)
4	1902/4/18	-	-	-	Ms=7.9(Alfaro et al, 1990)	-	-	-	A tsunami of Ahuachapan destroyed Barra de Santiago, Cara Suciy Garita Palmera. There was the damage in El Salvador western part and San	Martinez (1978)
5	1912/7/18	-	-	-	Ms=5.9(White y Harlow, 1993)	-	-	-	The damage occurred in Armenia, Izcalco, Santa Ana for strong vibration.	Martinez (1978)
6	1917/6/8	-	-	-	Ms=6.5(White y Harlow, 1993)	-	-	-	A Boqueron volcano erupted. The damage occurred in Armenia by an earthquake, and there was the serious damage in Ateos, Sacacoyo, San Julian. There was the damage in San Salvador, Apopa, Nejapa, Quezaltepeque, Opico, Santa Tecla by	Jordan y Martinez (1978)
7	1951/5/6	17:03	13.52°	88.40°	Ms=6.0(White)	10	-	Jucuapa and Chinameca	-	White-1993
8	1951/5/6	17:08	13.52°	88.40°	Ms=6.2(White)	10	-	Jucuapa and Chinameca	More than 400 people died.	White-1993
9	1951/5/7	14:22	13.48°	88.45°	5.8(White)	10	-	Jucuapa and Chinameca	-	White-1993
10	1961/4/12	16:20	13.10°	88.90°	5.75(USGS)	122	San Salvador VI	The Pacific	There was the small damage in San Salvador and the El Salvador southern part.	USGS No 30-61(1961),CIG (Reporte Interno)
11	1965/5/3	4:01	13.65°	89.15°	Ms=6.0(White)	10	San Salvador VII	San Salvador	125 dead people, injured person 400, 4,000 houses were destroyed completely.	USGS No 44-65-1965 Lomnitz y Shulz (1966)White et al (1987)
12	1976/2/4	3:02	15.32°	89.08°	Ms=7.5	-	Guatemala City 5 IX, San Salvador V	Guatemala	In Guatemala, 254,750 houses are destroyed completely dead people 22,700 more than injured person 76,000. There was not the damage in San Salvador.	Geological Survey (1976)
13	1982/6/19	0:22	13.35°	89.63°	7	80	San Salvador VII	The Pacific	According to El Salvador Red Cross, eight dead people, injured person 96, the victim were about 5,000.	CIG-1983
14	1985/4/23	9:16	13.56°	88.67°	mb=4.8(USGS)	-	Berlin VI	Berlin, Depto. An Usulután area	5,000 times of earthquakes recorded higher than, and the sensed earthquake of a focal region was minimum 167 times.	USGS(1985)CIG (1985)
15	1986/10/10	11:49	13.67°	89.19°	mb=5.4(CIG-USGS)	-	San Salvador VIII-IX	San Salvador	It was 1,500 dead people, injured person 10,000, complete or partial destruction about 60,000 houses.	Alvarez (1987)
16	1988/11/3	8:47	13.88°	90.45°	mb=5.6(USGS)	69	Ahuachapan VI	The Pacific offing of the Guatemala Sam Jose south	There was the damage in five dead people, injured person several, around 100 houses in the Guatemalan southern part.	USGS-1988CIG (Reporte Interno)
From CIG (El Salvador ground engineering research center)										

Source: CIG (El Salvador ground engineering research center)

## (2) Lessons from the Great Hanshin Awaji (Kobe) Earthquake

In this section it is described how proper ICT facilities helped the recovery process after the Great Earthquake.

In Photo 2, the NTT building on the left stands without damage while the building on the right collapsed. In a major disaster it is crucial for preventing more deaths and spreading damages to provide appropriate information on disaster-hit area to rescuers in and out of the area. Immediately after the quake, the internet server of Kobe Foreign Language College continuously provided information on the situation and rescue work was done relying on this information. Telephone stations were put to work after 48 hours. It was initially estimated to take more than 10 years for Kobe to recover; actually 5 years later Kobe recovered to the former level. Securing of information network was said to be one of the key factors. However, in Photo 3, the fourth and the fifth floors of the Kobe City Hall collapsed and servers containing land and building registry and drawings of utilities were lost, and it took enormous time and cost to re-construct such data.



Photo-2



Photo-3

Source: "Ten years' record of Kobe after earthquake disaster", published by the Public Affairs Office of Kobe City

### 4.6.2 Current Situation of Servers of El Salvador Government



Photo-4



Photo-5



Photo-6

Source: JICA Study Team

The El Salvador Government actively utilizes ICT in its various functions. However, when hit by a major earthquake of the similar magnitude as in Japan, a serious disruption would take place due to unsafe data storage against natural disaster.

#### (1) On Government Buildings

Photo 4 shows a government building. No beam can be seen outside. Photo 6 shows the interior of the second floor of the CNR (Centro Nacional de Registros) Building. The central part of the second floor is an atrium; corridors are attached to walls in cantilever and connected by bridges. Beams are not visible; probably walls and beams are of the same thickness. Photo 5 shows a building opposite of NCR building. Its roof is of corrugated steel sheets and is built extremely light. Structural strength would be weak and not tight against water intrusion. Many cracks are visible on the joint of walls and pillars, probably due to the earthquake of 2001. Some cracks are over 5 mm wide and would have structural wall strength close to zero. Horizontal force would not be transmitted to pillars and the building may collapse in the next

earthquake. Little of government buildings are of steel pillar-beam structure, mostly of concrete structure. Many of buildings have parking spaces on the ground floor in the form of piloti structure. Without anti-earthquake walls placed in a good balance in such a structure, ground floor would collapse in a big earthquake.

(2) Server Room



Photo-7

Photo-8



Photo-9

Photo-10

Photo-11

Source: JICA Study Team

In many ministries servers are placed in the ground floor in a corner of fragile buildings, along with storage room or parking spaces. Let us look at the server room of CNR. CNR maintains land registry information using GIS and has a well developed application. Its server room is around 300 sq.meters wide and in a rather disorderly state as shown in Photo below. A harogen gas bombe is placed beside the server rack and little precaution is done against toppling in earthquake.

The PC rack used as servers shown in Photo 7 is placed on a shelf made of ordinary steel angles. It may collide at the wall in front and be destroyed in the case of severe earthquake. As shown in the Photo 8, various equipment such as CPU, DC power supply, UPS, backup reader, hard disc, and router are randomly placed and not in a orderly management. If the person in charge is transferred or replaced, it would be quite difficult for the new person to assume the work. Backup is taken on tapes which are simply placed on the rack. In the event of earthquake confusion would occur. As shown in Photo 9, no cabling is done behind the rack; cables of power supply, Ethernet, UBS, and SCACI run in disorder. Not a good practice even in normal time, not to mention earthquake. Photo 10 shows how hard disc and power supply are placed. As shown in Photo 11, the team maintaining the servers is located under the cantilevered second floor corridor, which may collapse, disabling server operation.



Photo-12



Photo-13



Photo-14



Photo-15



Photo-16



Photo-17



Photo-18

Source: JICA Study Team

The server room of the Ministry of Finance is the best one among ministries inspected by the Study Team. It is placed in a corner of a parking lot (Photo 13), not an ideal location. It is in a room with an area of 300 sq.meters. Its entrance is equipped with a card security system as shown in Photo 14 and double doors protect against intruders. Inside is divided into a room with a main application server (Photo 18) and another room with a server for web and email (Photo 17). Routers and switches are bundled in a common gateway, making an integrated space. Operations are systematized. However, no manuals are in existence and in the event of disaster confusion arise.

Floor is a raised double and emergency power supplies corresponding to types of equipment are provided, a most comprehensive arrangement for power supply among ministries in El Salvador.

However, in terms of disaster preparedness, the numbers of batteries are inadequate, the capacity of UPS would allow only a few minutes, and no measure against fire is provided as no vent for haron gas is placed. In addition, racks are not securely bolted and the double floor is an ordinary type, not sufficient against shocks of earthquake. DC power supply is separated from AC power supply. No emergency power generator system seems to be in place. Probably the common generator for the whole building is used, a risk factor.

The Ministry of Internal Affairs has a server room and operation room which are protected by a card key system, similar to the Ministry of Finance. As slimier one shown in Photo 14, environment of the server room and the operation room is poor. The server room is of 100 sq.meters wide and servers are simply placed on desks, no precaution against disasters.



Photo-19

Photo-20

Photo-21

Source: JICA Study Team

The Ministry of Education’s ICT operation just moved to a new server room. Intra-ministry LAN is being laid in the ministry premises. Cabling charts and system structure charts have been prepared, and the new room is placed in the central core portion of the building, a relatively secure place in the building, indicating an adequate concern on the safety of the location. Operations room is close to the server room and little problem can be seen on the operation.



Photo-22

Photo-23

Photo-24



Photo-25

Photo-26

Photo-27

Source: JICA Study Team

The new server room is of 150 sq.meters wide. Its entrance is controlled by a card key system, and power supply, email and web servers, gateway, main servers are placed in orderly fashion, indicating the consideration for easy maintenance.

Main servers are to be used for budget management, operation management, document management of various schools.

A set of measures against disasters are taken such as double floor, harogen gas system, smoke detector, fire detector, etc. Cable racks for cabling are to be installed and on-site work would be easy. However, prevention of toppling, securing of double floor and computer packages are not considered, not secure enough against major earthquake.

In summary, the following defects are observed although not all are applicable to every ministry.

- 1) Structurally weak buildings containing server rooms may collapse in the event of major earthquake, resulting in extremely high cost for re-constructing data.
- 2) Power supply of the building and power supply of server room are not separated.

- 3) Poor location of server room
- 4) Lack of definite measures against disaster
- 5) Prevention of toppling of equipment
- 6) No halogen gas system
- 7) No securing of double floor or no double floor
- 8) Lack of fire extinguisher
- 9) Disorderly arrangement around server
- 10) Lack of proper arrangement by type of server
- 11) Inadequate power of HVCA
- 12) Inadequate cable system

In addition, because of server rooms being distributed among various ministries, loss of energy and loss by duplicated human resources are considerable. There is also a problem of lack of backup for maintenance.

#### 4.6.3 Development of Applications

According to the previous report (Progress Report and Interim Report) as a part of this feasibility study, many application systems are currently under planning. But an *e*-Service type of system is very limited. An additional investigation was executed after that. It is found that more *e*-Service application is in planning. The study was carried out through the use of surveys and the collection of questionnaires from IT directors in several agencies.

In some institutions, it is said that transactions have to be processed in person by law. In order to promote *e*-Services to citizens, reconsideration of the legal framework is one of the issues that is in need of further evaluation.

From the discussion in the *e*-Government sub committee in NCIS, some requirements have been raised.

- 1) Government to Government (G2G)
  - Relationship inside the public services
    - CRM, ERP, Human Resources, Public Investment
  - Inter-institutional data sharing of the public registries
    - Public Treasury, Commerce, Real Estate Property, Intellectual Property, Police
  - National Statistics
  - Land Administration System
  - Emergency administration system
  - Municipal, Fiscal, etc
- 2) Government to Citizens and Companies (G2C/G2B)
  - Single Windows for Government services (Portal)
  - Government Procurement
  - One stop portal for company registration
  - Information of status of public registry procedures
    - Public Treasury, Commerce, Real Estate Property, Intellectual property, Police, Vehicle, Academic, Birth Certificates
  - Emission of public registry certificates
    - Public Treasury, Commerce, Real Estate Property, Intellectual property, Police, Vehicle, Academic, Birth Certificates, Environmental, Agricultural, Medical, etc
  - *e*-Medical File (*e*-Karte)
  - *e*-Voting

In addition to the items on the below table, some ministries are working for G2B type of services (Government to Business).

**Table 4.15 Government e-Services**

Organization	Current e-Services	Future e-Services
Ministry of Foreign Affairs	<ul style="list-style-type: none"> <li>The web page is basically informative. They don't offer services online, because it is required by law that most of the transactions must be made personally.</li> </ul>	None
Ministry of Internal Affairs	<ul style="list-style-type: none"> <li>The web page is basically informative. They don't offer services online, because it is required by law that most of the transactions must be made personally.</li> </ul>	<ul style="list-style-type: none"> <li>Migratory pre checking</li> </ul>
Municipality of Santa Tecla	<ul style="list-style-type: none"> <li>The web page is basically informative.</li> </ul>	<ul style="list-style-type: none"> <li>Ideas but no concrete plans</li> </ul>
Ministry of Economy	<ul style="list-style-type: none"> <li>The website <a href="http://www.minec.gob.sv">www.minec.gob.sv</a> provides Information</li> <li>DCE website <a href="http://www.elsalvadorcompite.gob.sv">www.elsalvadorcompite.gob.sv</a> where consults can be made regarding economic indicators, early alerts, sector studies, country profiles, CAFTA opportunities, economic indicator reports, etc.</li> <li>DIGESTYC website</li> <li><a href="http://www.digestyc.gob.sv">www.digestyc.gob.sv</a> where consults can be made regarding CPI indicators, population projections, agricultural, demographic, economic and labor statistics</li> <li>ENDE Website where consults can be made regarding the formulation of the National Statistical Development Strategy <a href="http://www.digestyc.gob.sv/siteende">www.digestyc.gob.sv/siteende</a></li> <li>Website of National Censuses <a href="http://www.censos.gob.sv">www.censos.gob.sv</a></li> </ul>	<ul style="list-style-type: none"> <li>Online import permits.</li> <li>Application of Project Administration for the Exporters and APE-FOEX, Virtual Self Diagnosis of Export Potential.</li> <li>FOEX (Foment of Exports) Website.</li> <li>Consult of the Status of Investor Procedures</li> <li>Consult of 6% Reimbursement Procedures</li> <li>Consult of Incentive Procedures.</li> <li>System of emission of solvencies of statistical registry, for the registration of commerce and industry</li> <li>System of Dissemination of Census Data where one can consult information of the Economic, Agricultural, Population and Housing Census, Household Income and Expenses Survey, Economic Directories</li> <li>Special Data Infrastructure System</li> <li>System of Dissemination and Consult of the Multiple Purpose Household Survey (MPSH) where one can consult socio-demographic, education, household, employment and income, health, etc. indicators.</li> <li>System of Dissemination and Consult of the Yearly, Monthly and Quarterly Economic Surveys</li> <li>System of Dissemination and Consult of the Consumer Price Index</li> </ul>



Organization	Current e-Services	Future e-Services
Ministry of Agriculture and Livestock	<ul style="list-style-type: none"> <li>The Web Site provides information.</li> </ul>	<ul style="list-style-type: none"> <li>Online Imports permits</li> </ul>
Ministry of Public Works	<ul style="list-style-type: none"> <li>The Web Site provides information.</li> </ul>	<ul style="list-style-type: none"> <li>Plans to implement a monitoring system of the services that citizens ask to the Vice Ministry of Transportation. This services include Traffic Ticket complains, Permits to provide transportation services, among others.</li> <li>Publish traffic routes and interactive bus routes on their website.</li> <li>Unique Service Window for housing projects.</li> </ul>
Ministry of Finance (Hacienda)	<ul style="list-style-type: none"> <li>Presentation of tax declaration online and online payment of taxes using a bank.</li> </ul>	<ul style="list-style-type: none"> <li>System for acquisition and hiring processes of the Government Institutions. The system analysis and design is being done by internal staff, but the development of the system is going to be outsourced.</li> </ul>
Ministry of Health and Social Assistance	<ul style="list-style-type: none"> <li>The Web Site provides information.</li> <li>There is a system that provides Hospital statistical data, but it's only for internal use, not available for citizens. It gathers information from the 30 hospitals around the country using VPN connections. The information they collect is diagnosis, days spent in the hospital, general information such as address, phone number, etc.</li> </ul>	<ul style="list-style-type: none"> <li>Extend the statistical data system to the Medical consultation service in the hospitals.</li> </ul>

Source: JICA Study Team

While they are not e-Services, there are a few urgent requirements that have been raised in the survey conducted by the Japanese Embassy in December 2005. This survey focused on citizens' personal information and MAP information. It recommended that personal and MAP information should be more integrated among systems and agencies. Regarded as personal information, data that RNP is managing should serve as the original for every citizens' personal data in the ministries. Substantial concerns were raised for those 2 types of information in terms of their necessity of securities and back-up functions.

#### 4.6.4 Operation, Maintenance and Management

The table below lists the breakdown of ICT personnel in selected government ministries. (This was investigated in June 2006.). This was executed via personal interviews with the IT directors of several government ministries. There is no specific description for the IT departments or divisions within the selected government ministries; however, it can be summarized as shown below.

- 15% of the total staff engage in network areas.
- 25% are in charge of development.
- 30% are for technical support.
- Others are management, user support, and administrators.

In the Progress Report, the number of ICT personnel in central government agencies was estimated to be between 300 to 500 persons. Among them 80 to 130 persons may be in charge of development. In

addition to those staff, system development is outsourced on a project basis with some contract staff being hired if necessary. According to the Progress Report, some percentage of contract staff was working in central government agencies. Taking this into consideration, it can be said that there is a certain number of development staff in the government. Assembling these resources into an integrated organization can strengthen development power. (Each agency should keep a certain number of application development staff in order to handle agencies' specific requirements)

**Table 4.16 Information Technology Staff Government of El Salvador 2006**

<b>Institution: RNP (National Registry of Natural People)</b>	
<b>Description</b>	<b>Quantity</b>
IT Director	1
Data Base Administrator	1
Development Technician	1
Systems Operator	1
Help Desk Operator	1
Support Technician	1
Total	<b>6</b>

<b>Institution: CNR (National Registration Center)</b>	
<b>Description</b>	<b>Quantity</b>
Management Staff	5
Program Analysts	17
Data Base Administrators	3
Telecommunications, Servers and Added Services Technicians	17
Local IT Support (Located all around the country)	35
Hardware Technicians	7
IT Security	2
Quality Management	4
Internal User Help	3
Administrative and Support Staff	10
Total	<b>103</b>

<b>Institution: SNET (National Service of Territorial Studies)</b>	
<b>Description</b>	<b>Quantity</b>
Chief of Technology Unit	1
Geographic Information System Area Coordinator	1
Geographic Information System Specialist	2
Technical Support and Systems Administrator Specialist	1
Total	<b>5</b>

<b>Institution: Ministry of Internal Affairs</b>	
<b>Description</b>	<b>Quantity</b>
IT Director	1
Sub Chief of ICT Projects	1
Sub Chief of Systems Development	1
Sub Chief of Technical Support	1
Government Dependencies Sub Chief of Informatics	7
Data Base Administrator	2
Systems Development Technician	4
Telecommunications Technician	2
Support Technician	7
Secretary	2
Total	<b>28</b>

<b>Institution: Ministry of Economy</b>	
<b>Description</b>	<b>Quantity</b>
IT Director	1
Chief of Development and Technology	1
Chief of Technical Support	1
Technical Support Technicians	2
Total	<b>5</b>

<b>Institution: Ministry of Foreign Affairs (15)</b>	
<b>Description</b>	<b>Quantity</b>
IT Director	1
Management Assistant	1
Technical Support	4
System Development	1
Database Administrator	1
Development Annalist	1
Connectivity Area	2
Messaging Platform	2
Servers Platform	1
Network Technician	1
Total	<b>15</b>

<b>Institution: Ministry of Public Works (14)</b>	
<b>Description</b>	<b>Quantity</b>
IT Manager	1
Web Master	1
Database Administrator	1
Chief of Projects and System Maintenance	1
Chief of Technical Support	1
Users Support	2
Network Support	1
Geographic Information	2
Programmers	4
Total	<b>14</b>

<b>Institution: Ministry of Finance (80) &lt;below figures are only from DINAFI&gt;</b>	
<b>Description</b>	<b>Quantity</b>
ICT Director	1
System Development Area	17
Customer Service	7
Technical Support	12
Networks and Telecommunications	8
Information Security	3
Total	<b>48</b>

<b>Institution: Ministry of Health and Social Assistance (13)</b>	
<b>Description</b>	<b>Quantity</b>
IT Director	1
System Development and Support	6
Network Support	2
Central Network Management	2
Technical Support	2
Total	<b>13</b>

Source: JICA Study Team

**Table 4.17 Active Hours of Equipment**

<b>Organization</b>	<b>Activity</b>
Ministry of Foreign Affairs	Systems: 24 hours a day, 7 days a week. Staff works from 7:30 am to 3:30 pm. Remote access to troubleshoot servers. No overtime payment, employees collaborate if there are problems.
Ministry of Internal Affairs	Systems: 24 hours a day, 7 days a week. Staff works from 7:30 am to 6:00 pm. Remote access to troubleshoot servers. There are employees responsible for troubleshooting if there are problems outside the work schedule and for this their schedules rotate.
Municipality of Santa Tecla	Systems: 24 hours a day, 7 days a week. Staff works from 8:00 am to 5:00 pm. No remote access. Employees collaborate outside working hours if it's needed.
Ministry of Economy	Systems: 24 hours a day, 7 days a week. Staff works from 7:30 am to 3:30 pm. Employees are on call in case of emergency.
Ministry of Agriculture and Livestock	Systems: 24 hours a day, 7 days a week. Staff works from 7:30 am to 3:30 pm. Employees are on call in case of emergency. No remote access to servers.
Ministry of Public Works	Systems: 24 hours a day, 7 days a week. Staff works from 7:30 am to 3:30 pm, but they usually stay until late. Employees are on call in case of emergency. If users have a problem and there are no IT personnel because of the hour, they wait until the next day. No remote access to servers.
Ministry of Finance (Hacienda)	Systems: 24 hours a day, 7 days a week. Management and Technical Staff work 8 hours a day, 5 days a week. Operative Staff at the Data Processing Center works 24 hours a day, 7 days a week.
Ministry of Health and Social Assistance	Systems: 24 hours a day, 7 days a week. Staff works from 7:30 am to 3:30 pm. Remote access to troubleshoot and monitor servers. Employees take turns to work on weekends and holidays.

Source: JICA Study Team

From the above two tables, it can be said that organization for stable system operation does not exist. On Table 4.16, there are few staff members who are dedicated to taking care of system operations. Although systems are working 24 hours a day, no one is monitoring them via troubleshooting the systems for traffic jams, etc. Because currently most of systems are for internal implying that there are only a limited number of users and that they use the systems only during business hours. But once many general users come into the system, the current organization is not workable. System providers (the government in this case) have to prepare users' single windows for any kind of troubles or inquiries even during

government off hours of operation. During those times, operators must monitor any motions and to identify trouble before users recognize it.

**Table 4.18 Data Backup for Equipment**

<b>Organization</b>	<b>Backup Frequency</b>	<b>Backup Storage</b>	<b>Backup Space</b>	<b>Needs</b>
Ministry of Foreign Affairs	Once a week, but they are changing to once a day.	Copy of backup stored in own building.	300 GB - 400 GB	Implementation of clusters for service availability.
Ministry of Internal Affairs	Three types: 1. Daily. Database - 2. Every 15 days. Administration Services - 3. Monthly or every 3 months. Branch offices Databases.	Copy of backup stored in another server located in the same building.	100 GB	Automatic robotized backup unit, using mobile media to transport to other places.
Municipality of Santa Tecla	Daily Database backup and Monthly of some important files.	Copy of backup stored in same building.	80 GB	Backup of transaction log several times a day. Daily incremental backup. Weekly Full backup.
Ministry of Economy	Automatic daily backup using a disk array, kept inside the Ministry and every week is sent to another storage facility provided by an external company.	Weekly copy of backup stored in a private company disaster proof facility.	10 GB	Workstations backup.
Ministry of Agriculture and Livestock	Daily Database backup. Performed manually.	In a safe box in the same building.	50 GB	Online backups.
Ministry of Public Works	Daily Database backup. Currently they use Tape, but they recently purchased a backup server (TIVOLI).	Each week they place the backup copy in a safe box in a bank.	4 GB	A safe place to store the backup copies.
Ministry of Finance (Hacienda)	Daily.	External site.	200 GB	-
Ministry of Health and Social Assistance	Daily.	Inside the same building. They just purchased a SAN server.	5GB	Training to manage the server.

Source: JICA Study Team

**Table 4.19 System Backup**

Organization	System Backup
Ministry of Foreign Affairs	Non-existent. They have identified other Ministries with similar servers to support their applications in case of disaster, but no official agreement has been made.
Ministry of Agriculture and Livestock	No complete system backup. It is done manually each day and they could recover the system but based in those backup tapes.
Ministry of Public Works	It is included in the daily backup.
Ministry of Finance (Hacienda)	Partial recovery system (SAFI.Central) for natural disasters.
Ministry of Health and Social Assistance	The system is backed up in a CD; each time changes are made (Not very often).

Source: JICA Study Team

The two tables above show the results of the survey completed in June 2006, which demonstrates that most of institutes do not have back up in different locations. Many important data are unprotected from severe disasters. If a system is damaged, it may not be revived for a long time. Moreover, data may be lost due to the lack of daily back up storage in the different locations from where the servers are located. The recovery the data is costly and time-consuming.

The last table shows the cases of current outsourcing of operational processes in selected ministries. According to the table, hardware maintenance is provided by private companies, with a different company providing maintenance to each agency. System development is also an area that is outsourced. Unifying outsourcing policies including integrating contracts may save costs and obtain better services.

**Table 4.20 Outsourced Services of Equipment**

Organization	Service
Ministry of Foreign Affairs	Preventative and Corrective Maintenance provided by a company named IPESA.
Ministry of Internal Affairs	Corrective Maintenance provided by different companies (C&C, ALCATEL)
Municipality of Santa Tecla	Corrective Maintenance, the outsourced company depends on the equipment that needs the maintenance. Training Services provided by ALPHA IT.
Ministry of Economy	Backup Storage Service, provided by a company named PERGAMINO.
Ministry of Agriculture and Livestock	Preventative and Corrective Maintenance provided by a company named ECOS. Also application development services, depending on the needs of the Ministry.
Ministry of Public Works	Preventive Maintenance and Technical Support provided by a company named COMPUTEL. Software development (SAFI-PLUS System) by a company named EUROLATINA.
Ministry of Finance (Hacienda)	Data and Voice Communication Links. Internet Links. Technical Support for Telecommunications and Security equipment. Corrective and Preventive maintenance of Telephonic Centrals. Analogical and Digital (E1) Telephony services. Mobile Phone service. Antivirus and Internet Content Filter. Corrective and Preventive maintenance of Unix and Windows Servers. Technical Support for Unix and Windows Servers OS. Business Intelligence Applications Support. System Development. Development Tools Support and Maintenance. External Backup Storage.
Ministry of Health and Social Assistance	Preventive and Corrective Maintenance to a company named COMPUTEL. Telecommunication Services.

Source: JICA Study Team

## Chapter 5 Policy Analysis

### 5.1 Existing Plans and Reports

Existing documents issued by the Government of El Salvador with certain relevance to the e-Government concept and IT sector development have been reviewed.

The following is a summary of documents that have been issued by entities within the Government of El Salvador and / or other important experts, regarding the subjects related to e-Government and / or ICT industry.

#### 5.1.1 JBIC Master Plan

This study was conducted with Japanese funding in two phases of 1) IT Maturity Survey for PPP Countries (from April 2003 to October 2003) and 2) IT Master Plan Study for El Salvador (from October 2003 to March 2004). The study covered policies on: i) institutional and legal framework; ii) e-Government; iii) economy and industry; iv) human resources development; and v) ICT infrastructure.

Specifically on e-Government, the IT Master Plan proposed the strategy listed in Table 5.1.

**Table 5.1 Project Prioritization (e-Government)**

No.	Program	Project Title	Project Summary (Objectives, Contents, Characteristics)	Evaluation
EG1	Centralization of e-Government function	"e-Government Center" Building	Data center, Software development center, Training hub, Offices will be located. It will be a symbol of Salvadorian IT.	○ Highest Priority
EG2	↑	Coordination Center	This executes intra-ministerial coordination for IT projects and related operational issues.	○ Highest Priority
EG3	↑	Technology Bank	This is a kind of a pool of engineers for centralized resources and technology.	○ Highest Priority
EG4	↑	Training Hub	Organization of leading IT training for government officers and citizens for e-Government with training center.	○ Highest Priority
EG5	↑	R&D Center	Facilitation for IT related Research and Development.	×
EG6	Development/improvement and installation of application	Government general affairs system	Government general affairs system	○ Highest Priority
EG7	↑	Develop Government portal	A few kinds of government portal sites to connect with many kinds of services will be developed.	○ Highest Priority
EG8	↑	Government Basic Data Preparation	Standardize data format and interfaces for other applications and prepare operation and maintenance for users Topographic Maps Digitization Statistics	△
EG9	↑	Application for public services	Environment/Resources/Disaster Management System Company registration system for FDI promotion Social Security/Pension System	△
EG10	↑	Application for government internal use	Immigration and border control Criminal database Project management system for foreign assistance Road Management System	△

No.	Program	Project Title	Project Summary (Objectives, Contents, Characteristics)	Evaluation
EG11	Standardization	Standardization	Development of policy/standard/guideline for system development, operation & maintenance, data management, etc. including creation of data directory.	○ Highest Priority
EG12	Development of e-Government Infrastructure	Government WAN	Install Inter-ministry wide area network	○ Highest Priority
EG13	↑	e-KIOSK	Develop e-Government terminals	△

Source: "IT Master Plan" 2004, page 4-8.

The Study recommended the following policies:

- El Salvador should authorize the IT Master Plan proposed in this Study as the National IT Master Plan as early as possible, and should implement the action plan, program and project presented in the IT Master Plan immediately;
- In particular, strengthening of the central body within the IT sector, including authorization of the body, is urgently required. The central body should be a leading organization for the implementation of the Master Plan;
- The central body could be a recipient organization of external funds if the organization is authorized and has the proper status. For the smooth implementation of the project listed in the Master Plan, the immediate strengthening of the central body is strongly recommended;
- As for the implementation of the project suitable for the JBIC Loan, it is recommended that the Salvadorian side makes further discussions with JBIC officials about the implementation method based on this proposal, as this proposed scheme is not a standard style of JBIC loan operations;
- As for the implementation of the project suitable for technical assistance, it is recommended to include the establishment and strengthening of NCIS or PIU into a development study or project type technical assistance as the alternatives;
- El Salvador should present the Master Plan to other PPP countries at the PPP ICT commission meeting to lead the discussion on ICT sector promotion as the chair country of the commission. It should work to promote the expansion and exchange of the knowledge of the Master Plan in terms of institutional and legal frameworks, human resources development, standardization of data infrastructure, etc; and
- It is noted that projects include a region-wide approach. Those projects could be expanded or shared among the PPP region. The Government of El Salvador is required to disclose such concepts to the other PPP countries in the region.

### 5.1.2 Government of El Salvador

#### (1) Technical Secretariat

"Estrategia ePaís" (ePaís Strategy) (developed by the National Commission for the Information Society. Not yet released).

<Start of Quote from memo of ePaís Strategy> "ELECTRONIC GOVERNMENT OF EL SALVADOR" NATIONAL COMMISSION FOR THE INFORMATION SOCIETY (CNSI in Spanish), February 2006.

#### 1) Vision

An Electronic Government that is modern, efficient, transparent, available, and reliable for all of its citizens, companies and organizations that is also a catalyst of the development of the ICT industry, for the benefit of the economy of the country and social development.



*Modern:* in the sense that the intensive use of the information and telecommunication technologies generates a dynamic that helps the Government modernize its functions, especially when in the year 2006 we still find Government offices with manual procedures.

*Efficient:* implies a complete reorientation of its services, focused on their facilitation to its citizens and companies; adapting them to the technological support but seeing the ICT as a “means” and not as an “objective”. Furthermore, that it seeks the inter-institutional integration and coordination, exploiting the available resources and the best practices that these institutions possess.

*Transparent:* in the sense that it offers opportune, sufficient and understandable information to all of its citizens and companies, offering equal opportunities for everyone; promoting the participation of all its actors and the official democratic suffrage, so necessary for the development of an emerging country such as ours.

*Available:* that breaks the barriers of service hours, of geographic location, and that also uses different means to approach the different citizens and companies.

*Reliable:* the public administration must guarantee the safety of electronic transactions and the protection of private information; developing mechanisms of authentication and identity management, as well as the privacy of the information that requires it; in such a manner that the citizens, the companies and the Government itself disposes of these services without fear.

*Development of the ICT:* for the sustainable development of the Electronic Government, the state must foment the investigation and development of the ICT Industry, disposing of an infrastructure and organized community of specialists, gifted with the technical resources that are necessary for the investigation, innovation and adaptation of the information technologies.

El Salvador has a Government based on the suitable use of the ICT, and this makes it modern, efficient, transparent, available and reliable to all its citizens, companies and organizations. In addition, it promotes the development of the ICT industry, for the benefit of the economy and the social development of the country.

## 2) Objectives

The objectives established for an Electronic Government (*e-Government*) strategy must be oriented towards modernizing and improving the role of the services suppliers to their clients:

- To focus the services of *e-Government* to the citizen and their necessities;
- To obtain the unification and integration of the information for the people, natural and legal, within the organizations of the Government in a single point, to avoid unnecessary redundancies;
- To modernize and fortify the on-line services of the institutions of the Executive, Legislative and Judicial agencies, and local Governments, so that they take advantage of ICT;
- To integrate and to facilitate information and services between the central Government and the local Governments with the objective of improving the attention to the citizen; and
- To make the society and economy of El Salvador a model for good practice, on the use and benefit of ICT in the Government.

Also relevant is the list of the main lines of work for the development and implementation of the *e-Government* Platform.

## 3) *e-Government* components according to *e-País* Strategy

- Electronic government central organization
- Norms and standards
- Government to government
- Government to people
- Electronic government portal

- Education and training
- Research and development center

<End of Quote from memo of ePaís Strategy> “ELECTRONIC GOVERNMENT OF EL SALVADOR” NATIONAL COMMISSION FOR THE INFORMATION SOCIETY (CNSI in Spanish), February 2006.

## (2) Manuel Enrique Hinds

This highly regarded intellectual Manuel Enrique Hinds, former Salvadorian minister of Finance and well-known intellectual wrote “Un Espejo Distante: Transformando El Salvador a través de la Conectividad” (“A Distant Mirror: Transforming El Salvador through Connectivity”, August 2004.

This very interesting analysis has been published in several documents, magazines and newspapers (El Diario de Hoy, Banco Central de Reserva Magazine) and used as input for public discussion and policies.

The essay written by Hinds, which is an excerpt from one of his books, contains a very detailed look at the necessary steps and benefits from an e-Government and the task of connectivity in El Salvador.

<Start of Quote from “A Distant Mirror”>

### 1) Connectivity and the Government

Connectivity provides the only viable means to give to the government agility to respond to the necessities of the population in a consistent way. Combined with a data network and contacts at the national level, such as the ones that the National Commission of Development, the municipalities and other institutions the government could have instantaneous information about what is happening in the communities around the country--people’s aspirations, projects, the areas that need aid and in which local people could provide their leadership for communal actions. This would give a new meaning to the word democracy and would integrate communities within national development efforts.

This subject is covered in detail in the chapters about electronic government contained in this book. The following paragraphs provide only a sample of the many benefits that connectivity would give to the town in this dimension.

**Transparency.** Connectivity is the best instrument to realize the priorities of the country: the transparency in the administration of the public resources. As an example of this dimension of connectivity, the project of electronic purchases (COMPRASAL) that is discussed in this book was designed to have all the purchases of government on-line, beginning with a module of notification in which the information of all the purchases as well as the terms of reference would be published on the Internet and finishing with a module by which all the purchases would be made on-line, not only demonstrating transparency but also reducing the costs considerably. The small companies would receive training to bid on and know results through the Infocentros. This and other similar instruments that provide transparency to state operations are the best mechanisms to fight the corruption. Other ideas, such as creating offices with this objective, encounter the problem that they duplicate functions that exist in other institutions, such as the Office of the Public Prosecutor, the Court of Controller, the National Civil Police, the press, who have not been able to avoid the corruption because when they discover the deed, it is already executed. Those same problems would also be present if another instance was created for the subject, with the aggravation that this office would become culprit of negligence or complicity in the eyes of the public if any case of corruption occurred, which would be inevitable if the information is not transparent. That is to say, the source of the problem is the lack of transparency, and that is the one that has to be attacked. The existing institutions can work better if they can rely on transparent information like that which connectivity can provide, and assisted by the citizens in general who would have access to this information.

**Simplification of processes and time and money saving measures for the population.** With connectivity people would not have to go farther than an Infocentro to carry out a number of transactions that now force them to travel to distant places with considerable costs and time. Within those places, the waiting lines would be eliminated and the costs would decrease. This includes obtaining birth, marriage

and other certificates, as well as payments of fees and taxes. Many of these actions can be simplified and be carried out by cellular telephone. Other transactions, like obtaining good behavior certificates from the PNC (National Civil Police), which is an obstacle in the labor market, could be completely eliminated just by putting a list of the people with criminal file in the Internet. The saving of money, time and frustration that this would give to the population would be much appreciated. An important part of this system would be the portal of electronic payments to the government, who would allow the payment of all public services through a computer or a cellular telephone. This service would also be made available to the private sector so that they can also make their transactions.

**Streamlining of the necessary businesses transactions.** Competitiveness requires great agility for companies to answer on the part of the necessities of their clients. Since the government interacts so intimately with the private sector in all of its activities, it is essential that the government works at the speed required by the markets. Connectivity allows them to do this in real time.

**Security.** Security has several dimensions, among them the security against crime and the security against natural disasters. The formation of electronic networks would give a qualitative jump in the efficiency of the efforts to provide security in both dimensions.

**Security against crime.** The creation of virtual networks of security would substantially increase the effectiveness of the police actions. The effectiveness of these actions depends crucially on information, and for that the electronic networks are the best. The program of Zero Tolerance of the city of the New York, which has been very successful in the last few decades, was possible because it was based on a communication network between the community and the police, and between the same police forces. This allowed an efficient and fast unfolding from the patrols to the required places, the analysis of the patterns of crimes and the design of strategies to fight them. Using these technologies El Salvador would multiply the efficiency of the resources now used to fight the crime at very low cost.

**Handling of natural disasters.** As it is well known, the success in handling emergencies of this type depends crucially on the speed of reaction and the precision obtained in the shipment of the aid to the places where it is most needed. The communal networks and government would assure that both tasks are carried out efficiently.

**The virtual consulate and the visas from the entire world.** This it is an example of an improvement of efficiency in the government that could very quickly help the promotion of investments and tourism. One of the problems that the promotion of investments currently faces is the issuing of visas for potential investors of countries where El Salvador does not have consulates. In order to visit the country these must send their passports to distant places. With the government network, linked to a safety scheme, a single virtual consulate in San Salvador for visa emission can be handled electronically. Each person would receive an electronic identification - similar to those of the electronic tickets - with which they would enter the country. The result would not only be the facilitation of the visits to El Salvador but also a better control of them, since the virtual consulate would have access to all the centralized information of the government in the archives of the local and international police.

*<End of Quote from "A Distant Mirror">*

(3) Juan José Daboub

Document: "La Reforma del Estado en El Salvador" ("State Reform in El Salvador")

According to Juan José Daboub ("La Reforma del Estado en El Salvador"), the previous government had already commenced the efforts of building an e-Government.

<Start of Quote from “State Reform in El Salvador”>

In a new stage of transformation of the State, we are in the process of implantation of an e-Government Platform. Emphasizing the efforts to create a State by which closing the digital breach, is more efficient in handling its resources, has a transparent and effective management of the provision of services; thus managing to reduce the economic, geographic and cultural barriers to reach its users.

For such purpose, a new era has begun in this government with the implementation of “star projects” that seek for to take care of citizen demand services; that have a strong impact in the transparency and efficiency of the state management; that take advantage of the progress made, by means of ICT; and that have a positive impact on governmental financial management by decreasing the transaction costs of the public organizations.

#### 1) Star projects

These “star projects” are:

- Government portal;
- On-line tributary declaration and the payment of taxes;
- Electronic payment of government services;
- Module of government purchases notification;
- Comprasal;
- CNR (national center of registrations) on line services;
- On-line construction permissions;
- On-line services of the registry of the familiar state;
- On-line consultation and electronic payment of traffic tickets, consultation of appeal to traffic tickets and information of seizures;
- On-line request of the dui (unique identification document) and appointment; and
- Government intranet phase I.

<End of Quote from “State Reform in El Salvador”>

Other important plans with references to ICT development have been made by the:

- **Ministry of Education:**
  - “El Plan Nacional de Educación” (“National Plan for Education”);
- **Ministry of Economy:**
  - “Programa Nacional de Competitividad” (“National Competitiveness Program”); and
  - “Estrategia Integral para el Desarrollo del Sector de Tecnologías de la Información (TI) en El Salvador” (“Integral Strategy for Development of IT Sector in El Salvador”).

## 5.2 Objectives of e-Government

### 5.2.1 National Objectives

It is commonly perceived in El Salvador that, although there are various objectives of e-Government, the most important objective is the improvement in services to the citizens. There are two aspects of service provided by e-Government. One is to enable citizens to enjoy the dissemination of information and services provided by the government under the convenience of directly using the Internet. The other is to provide more appropriate services to citizens by the government using IT. Especially in the case of e-Government in El Salvador, which can be thought of as a part of the e-Pais plan, it is socially and politically important to offer the people an environment of e-Government, thereby increasing the accessibility of the Internet. Therefore, it is necessary to give the former the higher priority. (However, it is necessary to arrange the system and data within the government to achieve this.) Services provided by local governments should be included in this since local governments are closer to citizens. Cooperation between central and local governments is very important in serving citizens in appropriate ways.

Secondly, the *e-Government* is expected to increase the efficiency of the Government in general. It would streamline the already over-complex work processes and bring much higher speed in various transactions within and without the Government, raising its efficiency.

Thirdly, it is expected that *e-Government* will contribute to the provision of services by the private sector to encourage private IT enterprises, promoting the use of ICT in private companies, to improve productivity and global competitiveness. For this, it is necessary to offer effective public system solutions so that the private companies may improve productivity and global competitiveness. Particularly, business opportunities can be expanded and global competitiveness will be improved by encouraging the participation of IT enterprises in constructing *e-Government* and its platform for its maintenance and operations.

People in different sectors of the country see the *e-Government* in different ways. The following two sections look at view-points of private sector and officials of the government in certain details.

### **5.2.2 Objectives of *e-Gov* (local companies perspective)**

#### 1) Logistics

- Implementation of standards and norms of development in the national industry
- Implementation of mechanisms of communication and integration of local developers
- Improvement of the current infrastructure of communication

#### 2) Human resources

- Alliances for transfers of knowledge
- Commitment to technological formation
- Opening of technological schools
- Implementation of models of technical certification of personnel

#### 3) Financial

- Creation of mechanisms of financial support (incubators) to service exporting companies
- Implementation of mechanisms for integrated marketing of products and services developed in the country

#### 4) Policy

- Unification of laws for exporting
- Presidential commitments for the development of the local industry of ICT services
- National development policy for local ICT companies
- Creation of promotion mechanisms and confidence of the Government of El Salvador towards local companies
- National policy of minimum hiring in the local industry for the development of the governmental projects

#### Relationship of the local industry and *e-Government* in El Salvador

- Only a few initiatives are known: FOEX, EXPRO, EXPORTA and PROESA
- Some isolated cases of progress are also known:
  - Ministry of Finance portal;
  - Comprasal (Procuring electronic system);
  - ISSS (Salvadoran Institute of Social Security);
  - CNR (National Center of Registration); and
  - BCR (Central Reserve Bank).

Contributions expected by the local companies to ICT due to the establishment of an e-Government Platform in El Salvador

- Sales of services to the Government
- The implementation of e-Government implies that the companies, both public and private, require more and better services to be able to sell services to the government to improve the export capabilities of services to the government in conditions equivalent to international companies
- The continuous work will extend the certified base of personnel
- The increase of work opportunities implies extension of resources and better qualification of the local industry of ICT
- Improvement of the quality level in all of the products and services provided by the local industry to the government and thus, to the other customers.
- Support of the government for the development of the local industry
- Improvement of hiring and contracting criteria
- Improvement of the credibility and confidence in the local industry
- Generation of solid and long term projects
- Definition of strategies of technological development
- Clear definition of the course of the technological development in the country
- Streamlining of proceedings of bidding and contracting of projects
- Simplification of the processes in proceedings with the government
- Regional unification in fiscal subjects
- Integration of supply and demand of knowledge with the universities and technological institutes

**5.2.3 Objectives of e-Gov (ministries officials' perspective)**

(1) Factors hindering the expansion of domestic and export markets

Some economic barriers exist that prevent the execution of models of incubation of software development companies. However, some funding could be provided by way of Proesa to support the export of services. This could help in:

- Structuring financial support for exporting services;
- Solving marketing aspects including:
  - Lack of identification of real opportunities and markets for the export of technology projects; and
  - Improvement of mechanisms of spreading of opportunities for exporting ICT services.

(2) Factors that can boost domestic and export markets

1) Logistics

The action plan proposes the creation of a responsible group (Ministry of Technology) that concentrates and unifies all the aspects of the technological development of the country with which it hopes to solve aspects including but not limited to:

- Non-unified borders and laws for services export;
- Lack of development norms and standards; and
- Lack of consistency and sustainability in the technological development.

2) Human resources

The National Commission for Information Society has developed a document that contains a plan of action for human resources development, with which aims to solve:

- The lack of qualified personal; and
- The lack of a national scheme of qualification and certification in technological aspects.

### 3) Financial

A plan exists to implement models of incubation of software developing companies by way of Proesa in order to support the export of services. The main objectives are:

- To structure financial support for the export of services;
- To solve marketing aspects such as:
  - The lack of identification of real opportunities and markets for the export of technology projects; and
  - Improvement in mechanisms for spreading the information about opportunities for ICT service exports.

### 4) Infrastructure

A document in progress by the National Commission for Information Society outlines the improvement of the current infrastructure of communication. See for example the document “Electronic Government in El Salvador” by the National Commission for Information Society, February 2006; which indicates progress in infrastructure though concrete data is not referred, it says “In El Salvador, the development of the information infrastructure has been driven by the success of the opening and modernization of the telecommunications market, which generated the conditions for the development of fixed telephony and the liberalization of mobile telephony. This opening positions us as leaders in the Central American region, also accompanied by a legal framework that propitiates open foreign investment”. The World Competitiveness report 2005-2006 shows that infrastructure improves in 2004 but the ranking decreases in 2005. This Study Team found progress in infrastructure made by the private sector and also in education made by the public sector, in particular by the Ministry of Education.

### 5) Policy

A document produced by the National Commission for Information Society covered the following aspects:

- Criteria for selection and hiring;
- Qualification in technological aspects;
- Governmental support for the development of the local IT industry;
- Implementation of development standards and norms within the national industry;
- Implementation of mechanisms of communication and integration of local developers; and
- Improvement of the current infrastructure of communication.

It tries to solve aspects such as:

- The lack of development policy of local ICT companies;
- The lack of support and confidence of the Government of El Salvador to the local companies;
- The lack of commitment of the Government to support the development of the national ICT industry; and
- Governmental apathy for the development of the national ICT industry.

### Relationship of the local industry and e-Government in El Salvador

There is a long-term vision (Plan 2021) that includes additional aspects such as:

- Human resource preparation;
- Resolution of legal aspects; and
- Implementation of connectivity.

Almost all the private sector of the country are involved in the project.

Contributions expected by the local ICT companies due to the establishment of an *e*-Government Platform in El Salvador

The document generated by the National Commission for Information Society, after being approved by the President, has an action plan that includes:

- Concentrated and unified procurement;
- Attributions and authorities responsible for the development; and
- Approaches for formal qualification with support of Insaforp.

The Government of El Salvador is aware it is the largest buyer of products and technological services in the country and that is why it looks for ways to support local companies, through the following:

- Procurement of services to local companies that allow them to improve their export capacities;
- Procurement based on quality standards and uniform criteria that allow the local companies to compete freely; and
- Establishment of long-term criteria that allow local companies to have an appropriate approach in the development of its technological resources.

**5.3 Policies for Promotion of ICT Industry by *e*-Government**

There are different policy options to promote the ICT industry by *e*-Government in El Salvador. As previous studies indicate, this report also supports their suggestions (see IT Master Plan, and CNSI on *e*-Gov - unpublished manuscript). In regard to *e*-Government, the CNSI proposes an evolution cycle, in three perspectives: the first one by the orientation of its services, the second one by how it is organized to provide them and the third one by the maturity of the services.

As indicated in the previous section, contributions expected by the local ICT companies by *e*-Government in El Salvador are divided in two broad fields:

- Sales of services to the Government; and
- Support of the Government for the development of the local industry.

At the end of 2003, there was a private sector survey done by the IT Cluster, which existed at that time. Although it was not comprehensive (it did not include all of the country, and it covered only 100 IT Salvadoran enterprises); and it was not made public, this Study Team have been authorized to use some of the data in this report.

**Table 5.2 Amount of IT Enterprises,  
by Commercial Status (More than one is possible)**

<b>Commercial status</b>	<b>Enterprises</b>
Independent software applications developer	83
Representative of international enterprise	25
Authorized distributor of international enterprise	20
Distributor / importer	14
Subsidiary of international enterprise	14
Joint venture	13

Source: CID / Gallup "Study of Software developers", December 2003.  
Restricted use, authorized by the Ministry of Economy.



**Table 5.3 Percentage of IT Enterprises,  
by Funding Source**

Funding source	Enterprises
Own resources	83%
Bank loan	14%
Joint venture	3%

Source: CID / Gallup "Study of Software developers",  
December 2003.

Restricted use, authorized by the Ministry of Economy.

**Table 5.4 Amount of IT Enterprises,  
by Number of Employees**

Employees	Enterprises
One person	15
Less than 10	54
Between 11 and 25	19
Between 26 and 49	7
50 and more	5

Source: CID / Gallup "Study of Software developers",  
December 2003.

Restricted use, authorized by the Ministry of Economy.

**Table 5.5 Average Monthly Salary, by Job Position**

Job position	Avg Monthly salary
Specialist	\$1,872
Manager	\$1,736
Process analyst	\$1,332
Graphics designer	\$1,100
Programmer analyst	\$1,080
Data base administrator	\$1,061
Developer	\$878
Others	\$1,765

Source: CID / Gallup "Study of Software developers", December  
2003.

Restricted use, authorized by the Ministry of Economy.

**Table 5.6 Percentage of Enterprises,  
by Quantity of Products Sold in 2002**

Products sold in 2002	% Enterprises
1 to 5	23%
6 to 10	21%
11 to 20	14%
21 to 50	12%
51 to 125	3%
126 to 200	3%
No answer	24%

Source: CID / Gallup "Study of Software developers",  
December 2003.

Restricted use, authorized by the Ministry of Economy.

**Table 5.7 Amount of IT Enterprises, by Sales Ranges**

Sales ranges	Years		
	2001	2002	2003
\$1 to \$50,000	33	33	33
\$50,001 to \$100,000	12	16	18
\$100,001 to \$200,000	10	12	10
\$200,001 to \$300,000	8	4	2
\$300,001 to \$500,000	6	10	7
\$500,001 and more	9	11	17

Source: CID / Gallup “Study of Software developers”, December 2003.  
Restricted use, authorized by the Ministry of Economy.

**Table 5.8 Average Percentage of Sales by Destination**

% of Sales by destination	Years		
	2001	2002	2003
Commercial	49	45	44
Government	54	40	35
Telecommunications	48	35	34
Services	36	34	30
Export	28	27	27
Industry	40	29	26
Finance	24	27	25
Others	19	28	37

Source: CID / Gallup “Study of Software developers”, December 2003.  
Restricted use, authorized by the Ministry of Economy.

**Table 5.9 Exports by Destination, First 3 Places**

Export destination	Percentage		
	First	Second	Third
Central America (as region)	28	7	4
United States	24	9	2
Guatemala	17	4	7
México	9	4	7
Honduras	7	7	4
Panama	0	0	7

Source: CID / Gallup “Study of Software developers”, December 2003.  
Restricted use, authorized by the Ministry of Economy.

These facts and figures clearly show that the national IT industry is still developing and needs to be promoted. One of the key buyers of ICT services and products is the government, which means that the role of the Government of El Salvador in promoting the national ICT industry is of the utmost importance, both in the quantity and quality of sales that could be completed in the local market. For this reason, the government should play a key role in promoting ICT industries by leveraging market policies.

The Study Team for ICT development is encouraging private sector participation through:

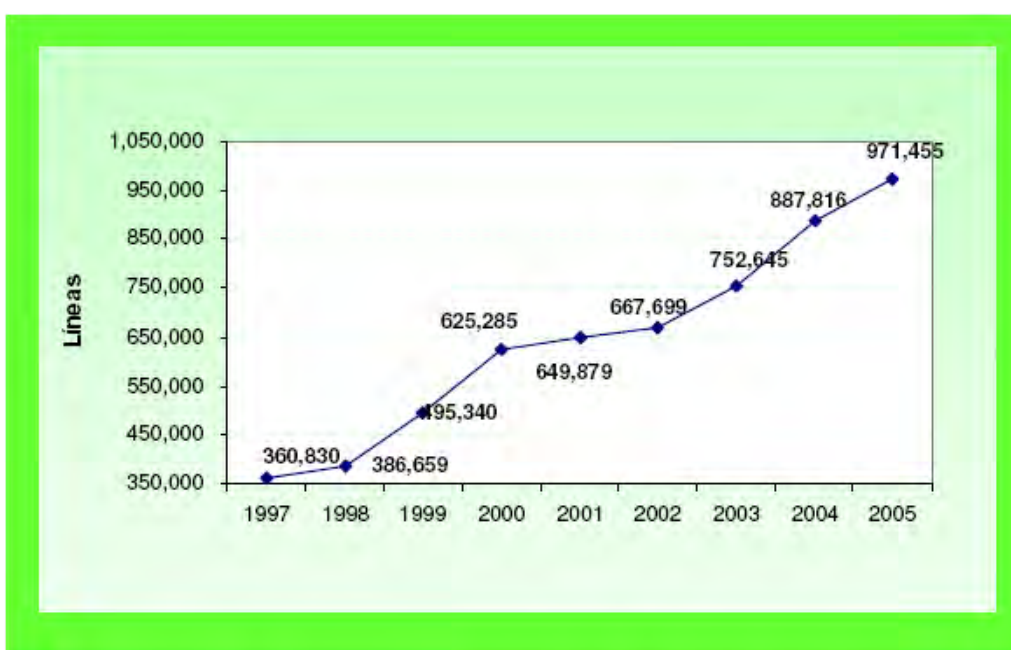
- Outsourcing to the private sector (O&M, training, etc.);
- Connectivity and market nurturing/creation in rural areas;
- Contract schemes to support private sector participation in provision of services to the public sector; and
- Training for the public sector to use resources from the ICT industry and universities.

## 5.4 Policies for Social Development

The e-Government will contribute to social development. For that purpose, reducing the Digital Divide is the most important, but it also is related to education, employment, improvement of training and human resources, and efficiency and competitiveness.

### 5.4.1 The State of the Digital Divide

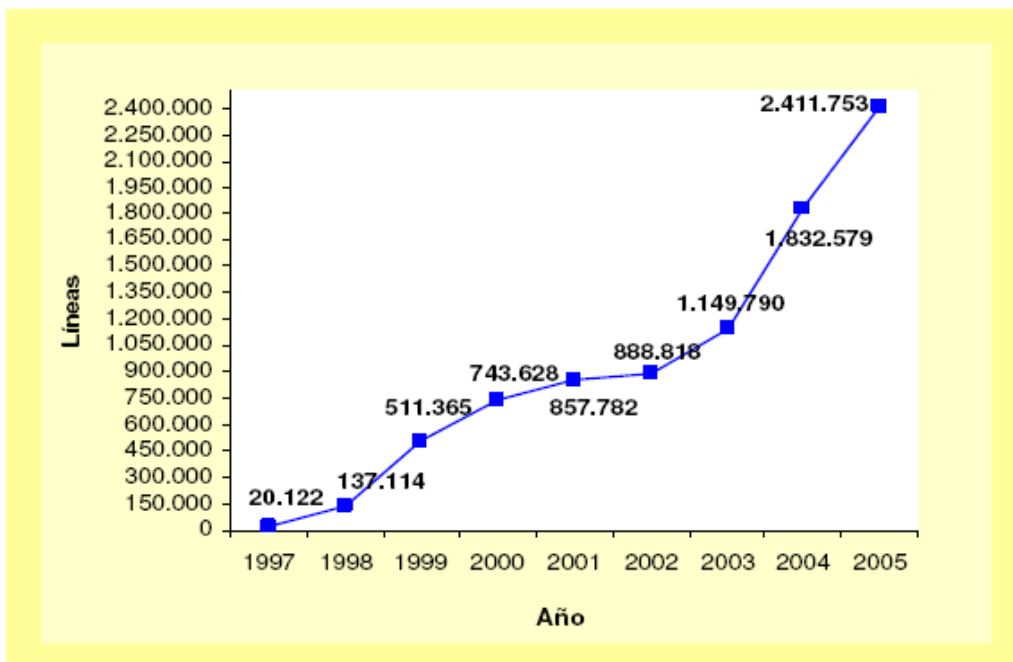
The following data provides a description of the digital divide in El Salvador with information pertaining to the entire country. There are no exact data that could describe the digital divide between San Salvador and the rest of the country or among different segments of the society. However, it is reasonable to assume that the Digital Divide is correlated to other general social indicators of different segments of the Salvadorian society. Therefore, ICT penetration and some social indicators were examined as presented below.



Source: SIGET

**Figure 5.1 Fixed Telephone Lines**

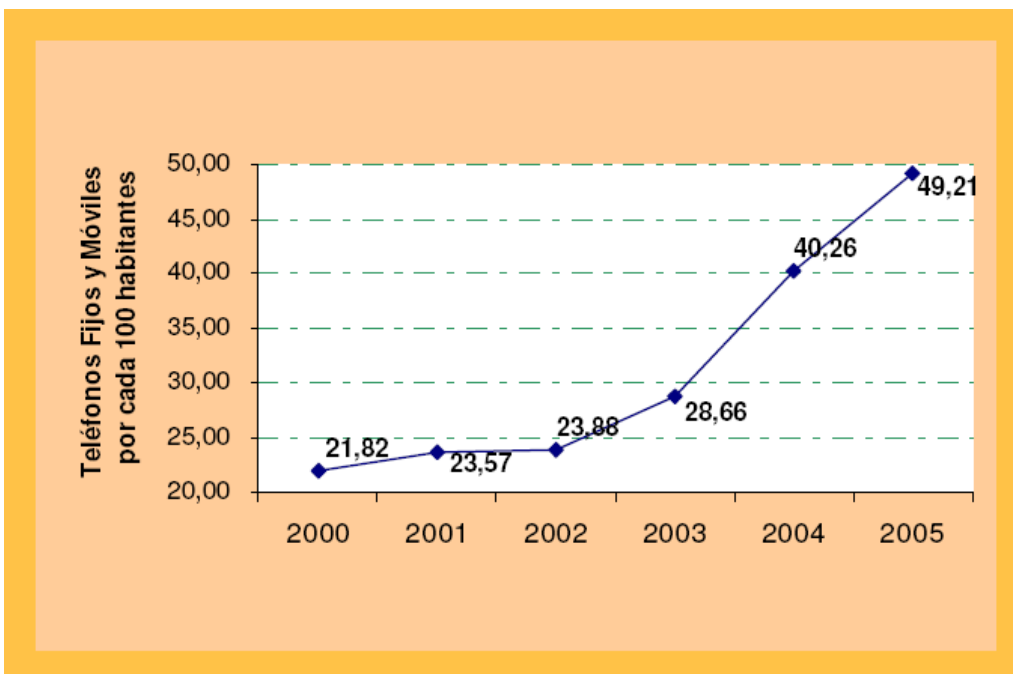
Fixed telephone lines have been growing in the last years after liberalization of services took place. In year 2005 according to SIGET total fixed lines were 971,455.



Source: SIGET

**Figure 5.2 Mobile Telephone Subscription**

Mobile telephone subscription as usual in other developing countries worldwide shows a clear growth. In year 2005 were 2,411,753. This information is important particularly for the Disaster Information System, which, besides PCs, must be accessed by mobile phones.



Source: SIGET

**Figure 5.3 Total Tele-density -Phone lines per 100 Inhabitants**

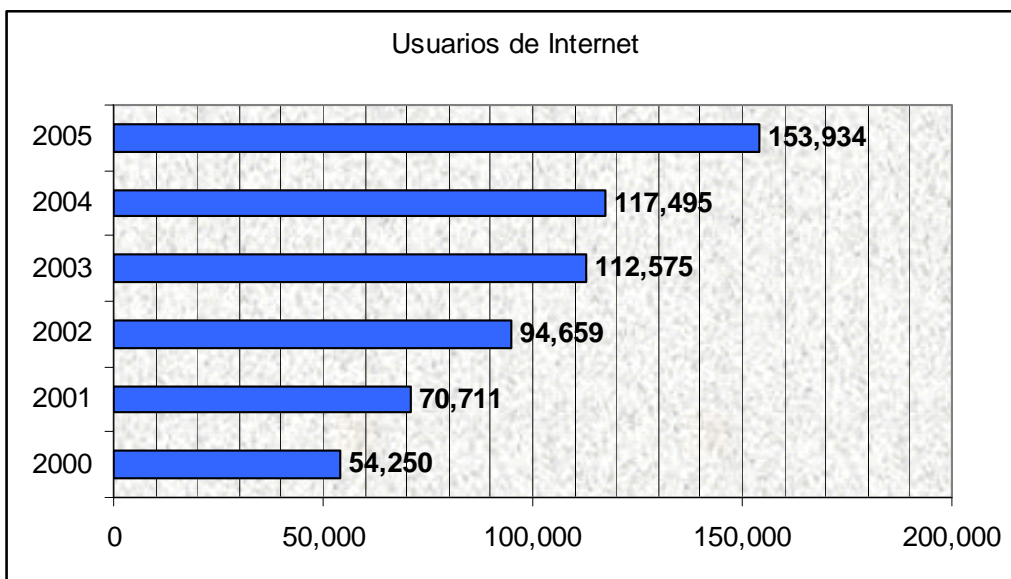
Figure 5.3 and Table 5.10 show the trend in Internet users. Growth rate is constant though number of users is still low. Regional comparisons data are not available.

**Table 5.10 Internet Users in El Salvador**

Years	Users
2000	54,250
2001	70,711
2002	94,659
2003	112,575
2004	117,495
2005	153,913

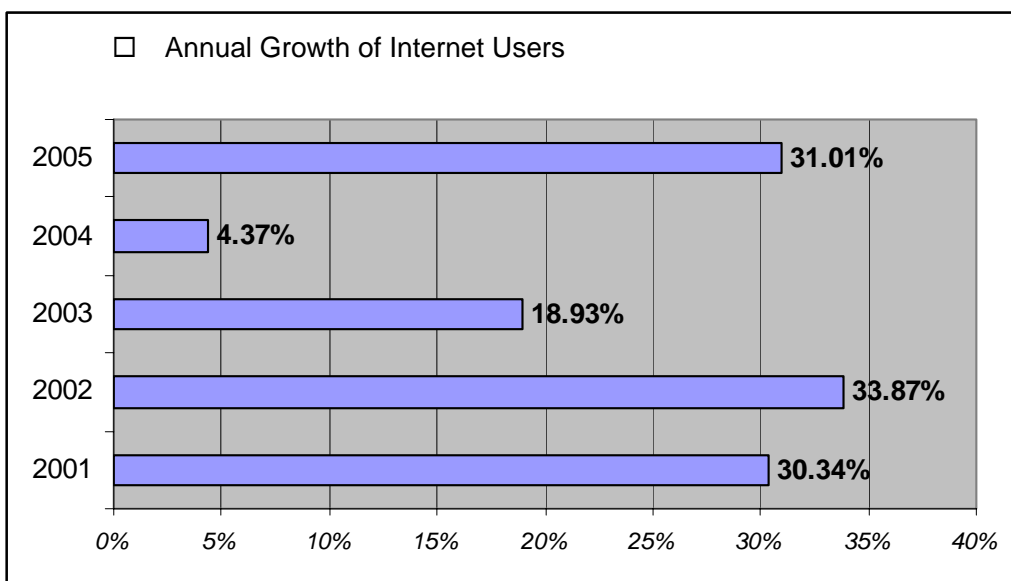
Source: SIGET

Note: Probably an overestimation.



Source: SIGET

**Figure 5.4 Internet Users (2000 - 2005)**

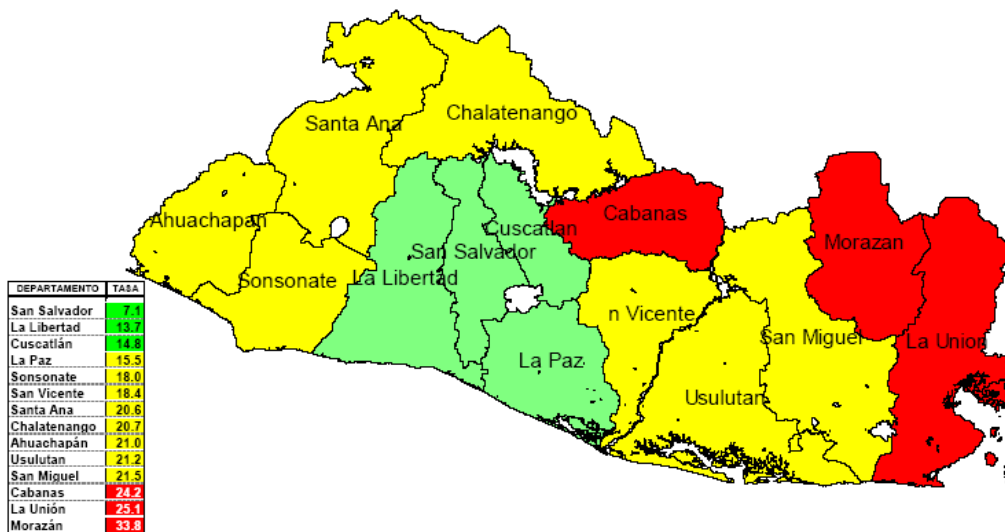


Source: Study Team's elaboration, based on SIGET data

**Figure 5.5 Annual Growth of Internet Users in El Salvador**

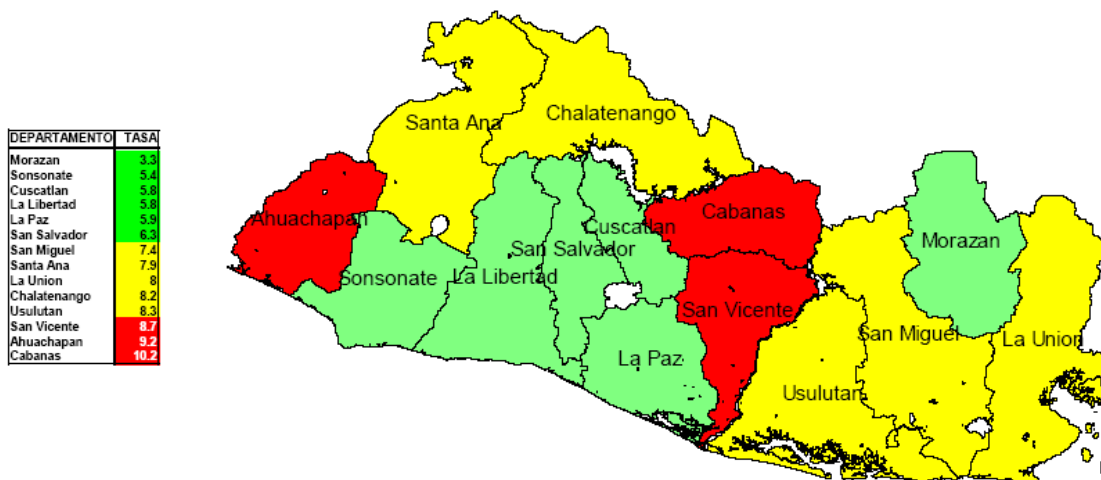
Description of digital divide between San Salvador and the rural areas

There is no exact data that could describe the digital divide between San Salvador and the rest of the country. Furthermore, being such a small country, and because there are differences in other social and human aspects, they may be examined assuming that the digital divide is correlated with illiteracy, unemployment and poverty indexes.



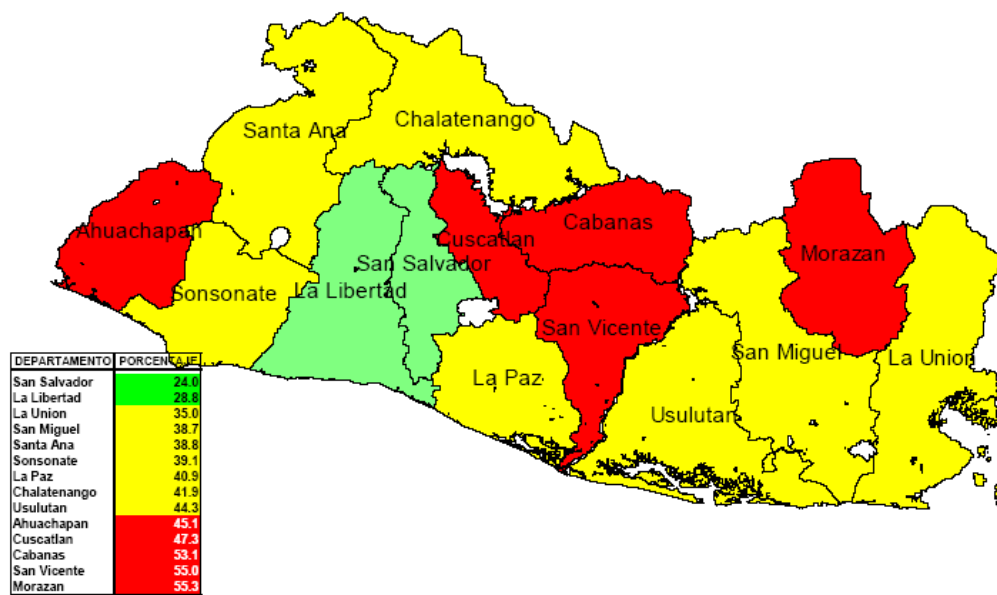
Source: DIGESTYC  
(Lower (best) is green, higher (worst) is red.)

Figure 5.6 El Salvador: Illiteracy Rates for Citizens 20 Years Older per Province



Source: DIGESTYC  
(Lower (best) is green, higher (worst) is red.)

Figure 5.7 El Salvador: Unemployment Rates for Citizens 20 Years Older per Province



Source: DIGESTYC  
(Lower (best) is green, higher (worst) is red.)

**Figure 5.8 El Salvador: Population Share in Total Poverty per Province**

The digital divide is not an IT gap, it is correlated with illiteracy, poverty and unemployment. A study made by Christina Courtright from SLIS-Indiana University in 2001 titled “Informationalizing El Salvador: Issues and challenges for digital divide researchers” showed that in 1999 El Salvador had approximately 7.6 telephone lines per 100 inhabitants and 25 lines per 100 households. After the privatization of Antel, the national telecom monopoly in 1998, competition among telecom companies started and by 2001 even the UNDP rated El Salvador a “dynamic adopter,” ranking of 54 out of 72 countries assessed in its Technological Achievement Index. Current situation is not so promising, for example the recent “Global Information Technology Report 2005-2006” situates El Salvador in position 59 in the ranking of Networked Readiness Index. (INSEAD and World Economic Forum, 2006)

### 5.4.2 Narrowing Digital Divide

In the case of El Salvador the keyword is connectivity. This is emphasized by the fact that digital divide is closely related with income inequality and the urban/rural divide. A scheme to narrow the digital divide should include simultaneously working on three aspects: rural disparities; economic inequality, and the underdeveloped ICT sector.

The main policies should address those structural problems by reducing gaps through a combination of strategies where possible elements are:

- Connectivity via free or minimum costs connections if possible in rural and poor areas;
- Facilitate access to PCs and Internet; and
- Enhancing Internet access at schools through applications.

These policies are short-term and comprise an essential part of the proposals suggested by the Study Team. However, in the midterm, a sustainable short-term scheme must be matched with a long-term strategy for ICT literacy. Several policies are in progress as observed in the following section.

### 5.4.3 Enhancing People’s ICT literacy

There are several policies in progress by the government and private sector to close the gap on the digital divide. This is worth mentioning in detail because they are related to education and connectivity, two axis of the digital divide.

Besides the ePaís effort, which is still in its a developmental phase, the other relevant effort made by the present government towards closing the gap is the National Education Plan 2021, carried out by the Ministry of Education.

#### (1) The National Education Plan 2021

The Government of El Salvador has started up the National Education Plan 2021, oriented to build a society based in knowledge, for which a country's vision has been identified, oriented to productivity, competitiveness, security and social tranquility, democracy, justice and sustainability.

##### 1) Educational objectives (up to 2021)

The National Education Plan has established the following four main targets for the education:

- Integral formation of people;
- Schooling of eleven grade levels for all the population;
- Technical and technological formation of the highest level; and
- Development of science and the technology for the well being of the society.

##### 2) Strategies

In order to reach the objectives established in the National Education Plan 2021, a set of policies grouped into four priority areas have been implemented.

- Access to education
  - Flexible modalities of education
  - Complete basic education
  - Universal elementary school
  - Literacy training for young people and adults
  - Education for diversity
- Effectiveness of basic and high school education
  - Suitable physical surroundings
  - Institutional framework to empower learning
  - Competent and motivated teachers
  - Educational curriculum to the service of learning
  - Accreditation and certification
- Competitiveness
  - Comprehensive English language training
  - Technology and connectivity
  - Technical and technological specialization
  - Higher education, with an emphasis on science and technology
- Good management practices
  - Expanded involvement of schools
  - Institutional development and social participation
  - Information, monitoring and evaluation systems

#### (2) CONÉCTATE

CONÉCTATE is one of the strategic axes of the program OPORTUNIDADES, encouraged by the Government of El Salvador (the other axes are: Red Solidaria which is an interministerial effort based on giving funds to poor people who commit to some requirements such as providing education to their children, helping on local water management projects, etc. Other projects relevant are Fosalud, Jóvenes and Microcrédito). CONECTATE as his name indicates is a concept around connectivity and technology, where IT is a kind of indivisible tool for development and education.

CONÉCTATE is oriented to provide the educational system the necessary technological tools that can improve academic quality and develop the technological competences that the current labor scope demands



to elevate the level of competitiveness of the country. Additionally, the program tries to improve the quality of electronic services.

CONÉCTATE is composed of five programs.

#### 1) Grado Digital

This is a program of Technological Certification that aims to certify, free of charge, abilities and competences in the basic handling of computer science technologies.

- Action lines
  - To facilitate access to better labor opportunities
  - To create a system of measurement and registration that provides the population with basic capacities in the handling of computer science technologies
  - To contribute an increase in the levels of competitiveness of the country
- Beneficiaries
  - Salvadorans older than 14 years, both inside and outside the national educative system
- Goal
  - 500 thousand people certified at the end of 2009.

#### 2) EDUNET

This is a program that offers the opportunity to access the services of connectivity to public educational centers, through a telecommunications network.

- Action items
  - Install the National telecommunications network
  - Start up EDUNET
- Beneficiaries
  - Students, teachers and members of educational communities within the institutions connected to EDUNET.
- Goal
  - 1,700 public educational centers connected

#### 3) Mi Portal

This is a program that will be made available to the educational community, through an Internet site, which will provide a multitude of information, including educational materials and services. Mi Portal will also contribute to the creation of a virtual national educational network that will allow the exchange of knowledge and experiences among its members of the educational community.

- Action items
  - To promote the participation of the educational community in the production of educational materials
  - Exchange of contents with other national and international educational portals.
- Goal
  - To reach 900 thousand students within the national educative system, through 50 new educational materials relevant to different geographic areas per year.

#### 4) Aulas Informáticas

This is an integral program to provide computer science laboratories to the educational centers and to develop educational technological competences for students.

- Action items
  - Equipping educative centers with the latest technology
  - Support and teacher training
- Goal
  - 1,100 Information technology classrooms by year 2009.

#### 5) Computadoras para mi escuela

This is a program to collect, by way of donations, computers and other computer science equipment from government institutions and the private sector. The refurbished equipment will be installed free of charge in the public educational centers.

- Action items
  - Collection of computer equipment as grants
  - Refurbishment of the computer equipment
  - Distribution and installation of computer equipment in educational centers
  - Teacher support and technical assistance
- Goal
  - 15 thousand computers collected, refurbished and installed in public schools by the end of 2009.

### **5.5 Promotion of PPP and Regional Development**

#### **5.5.1 The Plan Puebla Panama (PPP)**

On March 8<sup>th</sup>, 2001, Central America presented to the international community its medium- and long-term vision of development, known as the 'Agenda for the Transformation and Modernization of Central America for the 21st century', which reiterates the priority given to regional integration. A series of projects have been proposed, including large infrastructure interconnection projects. The Government of Mexico, led by President Vicente Fox, concluded that its PPP proposal would have a greater chance of success if it included the countries neighboring Mexico to the southeast, that is, the Central American countries. As a result, President Fox invited the region to participate in the PPP and in the search for a common objective of social and economic development in the region.

On March 12<sup>th</sup>, 2001, President Fox presented the Mexican chapter of the PPP, in which his government intends to develop the southeastern zone of Mexico, which includes nine states.

On June 15<sup>th</sup>, 2001, an Extraordinary Summit of Presidents of the Mechanism of Tuxtla (or the Central American isthmus, a high level Mexican forum took place. At this summit, the Presidents of the Central American countries launched the PPP as a shared development initiative converging their development strategies for the transformation and modernization of Central America and southeastern Mexico. The eight participants in the PPP are Mexico, Guatemala, Belize, El Salvador, Honduras, Nicaragua, Costa Rica and Panama.

The PPP is a medium- and long-term integrated development strategy that also includes environmental, social and disaster prevention aspects to achieve sustainable development. Among others, it includes plans to build large highway corridors, electrical networks, ports and airports to connect all of the development zones created from Panama to Mexico both quickly and efficiently.

#### 1) Action Areas and Initial Projects

The PPP adopted eight initiatives for the integration and the sustainable development of the region. These span a total of 34 initial projects. The initiatives are categorized according to strategic axes and have each been assigned to one member country for follow-up under the supervision of a Presidential Commissioner.

#### 2) Human Development Axis

##### Sustainable Development (Coordinated by Nicaragua)

The objective is to promote the conservation, sustainable handling of natural resources and mechanisms of participation in environmental management, especially of the local communities. Within the initiative, a Memorandum of Understanding of the Mesoamerican Initiative for Sustainable Development (June 2<sup>nd</sup>, 2003) and a Memorandum of Farming and Rural Development (November 13<sup>th</sup>, 2003) have been signed.

The Initiative also includes three programs/projects:

- Environmental Management Systems Program (PROSIGA);
- Sustainable Development of Natural Resources in Multinational Areas Mesoamerican Program; and
- Indigenous Consultation and Projects Design, Mesoamerican Biological Corridor.

#### Human Development (Coordinated by Mexico)

The objective is to reduce poverty, facilitate access to basic social services for vulnerable populations and contribute to integrated population development. A Memorandum of Understanding on the Creation of the Commission of Accreditation and Promotion of Educational Projects for the Mesoamerican Region (CAPP) (2002), a Memorandum of Understanding on Health (September 23<sup>rd</sup>, 2003) and a Memorandum of Human Development (March 25<sup>th</sup>, 2004) have been signed. This initiative includes four programs/projects:

- Regional Health and Human Development Program;
- Statistical Information System on Migrations;
- Education Chapter; and
- Demand and HR Formation Services for Mesoamerica System.

The Memorandum of Understanding on the Creation of the Commission of Accreditation and Promotion of Cultural Projects for Mesoamerica (CAPPC), which comprises the Cultural Component of the Mesoamerican Initiative for Human Development (IMDH) of the PPP, was signed in the Mexico City on August 24<sup>th</sup>, 2004.

#### Prevention and Mitigation of Natural Disasters (Coordinated by Panama)

The objective is to promote the prevention and mitigation of disasters in the region and to incorporate risk management in the projects of all the actors. On 13<sup>th</sup> November 2003, a Memorandum of Understanding on Disasters was signed. The initiative includes three projects:

- Public Awareness of Disaster Prevention;
- Hydro-Meteorological Information for Competitiveness; and
- Development of the Natural Disasters Insurance Market.

### 3) Productive Integration and Competitiveness Axis

#### Promotion of Tourism (Coordinated by Belize)

The objective is to promote the development of ecological, cultural and historical tourism by means of regional actions that emphasize the complementarities, economies of scale and the productive links of tourism. It includes five projects:

- Development of Integral Tourist Circuits in the Mesoamerican Region;
- Ethno-Tourism (Eco-Tourism Indigenous Projects);
- Strengthening of Airport Security;
- Implementation of Tourism Statistical Information Accounts; and
- Certification of Tourism Sustainability.

#### Commercial Exchange Facilitation (Coordinated by Honduras)

The objective is to support commercial exchange in the region by reducing transaction costs in intra-regional commerce and promoting the share of SMEs in exports. It includes four projects:

- Harmonization of Sanitary Standards, Origin Standards and Technical Standards (Project OIRSA);
- Modernization of Customs and Border Procedures (Project SIECA);

- Promotion of SMEs; and
- Technical Cooperation in the Financial Sector.

On May 4<sup>th</sup>, 2004, the Mesoamerican Council for Competitiveness was created with the objective of supporting the competitive development of SMEs under an exporting concept, as well as verifying that PPP projects are competitive.

#### Road Integration (Coordinated by Costa Rica)

The objective is to promote the physical integration of the region, to facilitate the transit of people and merchandise, and to reduce transport costs. On June 28<sup>th</sup> 2002, the Memorandum of Understanding on the Mesoamerican International Highways Network was signed. The Initiative includes five projects:

- Puebla-Panama or Pacific Corridor;
- Complementary Corridors (Branches and Complementary Regional Connections);
- Atlantic Corridor;
- Harmonization of Regulations and Technical Standards; and
- Modernization of Customs and Border Procedures.

#### Power Interconnection (Coordinated by Guatemala)

The objective is to interconnect the energy markets, particularly electrical, with the purpose of promoting an extension of investments in the sector and reducing the price of electricity. It includes five projects:

- SIEPAC: This is the Central America Electrical Interconnection System. There is an executive regional institution already in operation. There is also financing available for this project;
- Mexico-Guatemala Electrical Connection; there is a Memorandum of Understanding between the two countries;
- Guatemala-Belize Connection;
- Rural Electrification and Energy; and
- Promotion of Renewable Energies and Use of Bio-Fuels.

#### Integration of Telecommunication Services (Coordinated by El Salvador)

The objective is to broaden the supply and promote universal access to telecommunication services. It includes four projects.

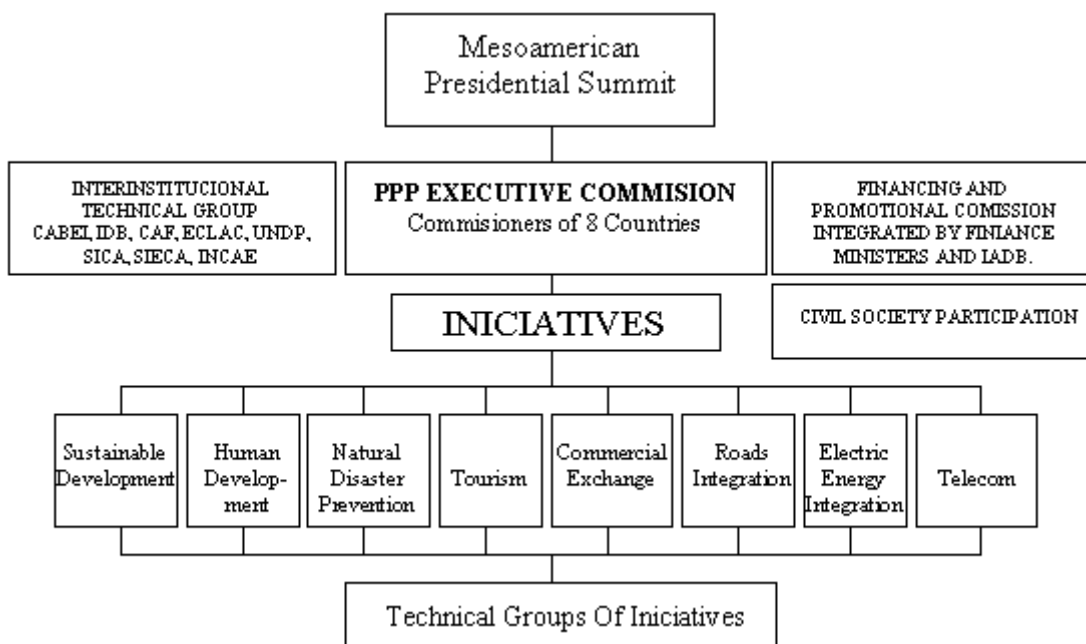
- Harmonized Regional Regulatory Framework
- Mesoamerican Information Highway (AMI)
- Neutral Access Point (regional NAP)
- Social use of ICT:
  - Digital Path (tele-centres); and
  - SIRCANET (rural connectivity).

### **5.5.2 e-Gov Platform and PPP**

El Salvador is the chair of the Mesoamerican Initiative of Integration of Telecommunication Services and in that capacity is leading efforts on e-Gov services within the region. This initiative works on reducing the digital divide by enhancing the use of IT in education, administration and services to citizens to improve quality of life.

This initiative through the PPP proposes to promote participation of the private sector in creating a modern telecommunication infrastructure toward interconnectivity within the PPP region and worldwide. Note that telecommunication and connectivity costs are a great concern, and led by El Salvador it was agreed that regional schemes were needed to reduce barriers to entry and reduce transaction and operational costs for governments, private companies and citizens. This goal is deeply embedded among senior Salvadorian officers, as this Study Team confirmed. As a result, PPP has been a vehicle to expand this

agenda and obtain the necessary studies to find investment and business models to reduce costs and increase savings where in parallel the digital divide is fought by a variety of schemes such as the e-Government Platform. A meeting was held at the PPP secretariat office in San Salvador and these objectives were discussed as regional aims of every PPP member country. Figure 5.9 shows the organization of the PPP Mesoamerican Presidential Summit, where “Telecom” is explicitly mentioned as one of the initiatives, it is worth noting that there are opinions willing to replace “Telecom” with an “e-Government” Initiative in the near future.



Source: Plan Puebla Panama, El Salvador Office

**Figure 5.9 Organizational Chart, Plan Puebla Panama**

A survey of opinions of concerned people demonstrates the ways and means of propagating the effect of e-Government in El Salvador to the PPP countries and to Central America as a whole. Also, as the Study Team researched in El Salvador, several neighboring countries have shown interest in the e-Government Platform, such as Honduras, Nicaragua and Guatemala. Their initial motivation is the reduction of high telecom and connectivity costs by better management and more efficiency. Common topics are also services to citizens and the e-Government as a condition of further economic take-off and development.

