INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) IN NICARAGUA

REPORT

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APENDICES

A. INTRODUCTION

1. Sida commissioned the present study in May 2002 to 7Cs WorldBridge AB. The objective of the study was to provide stakeholders in Nicaragua, as well as Sida and other international development agencies with information about, and an assessment of the present situation regarding Information and Communication Technologies (ICT) in Nicaragua. The report should provide national authorities with a basis for the development of an ICT policy and for the planning of related activities. Additionally, it should be useful for Sida and other development agencies when planning their assistance to such activities in Nicaragua (see Terms of Reference – Appendix 1).

2. At the outset Sida was aware of the fact that the *Commission for the Implementation of the Nicaraguan Development Gateway* already in March 2002 had initiated an "e-Readiness" study, with similar objectives, in preparation for the Nicaraguan Gateway.

3. In order to avoid duplication of efforts, the consultant in charge of the e-Readiness study, Mr. Cornelio Hopmann, was contacted before the present study was initiated. It was then discovered that Mr. Hopmann, with the assistance of Ms. Edith Maria Arce, had gathered an impressive amount of relevant information and was carrying out a comprehensive analysis of the of the ICT situation in Nicaragua.

4. The fact that Ms Arce was contracted to assist also in the present, Sida-funded study and Mr. Hopmann´s generous collaboration made it possible to draw on the results of the extensive research done for the e-Readiness study.

5. Unavoidably, there will be duplications in the reports of the two, partly simultaneous, studies. It is nevertheless hoped that the information and analysis provided in this report complements the e-Readiness study and other similar studies.

A.1. Methodology

6. The present study was initiated by a mission to Nicaragua (3-13 June 2002). During this mission interviews were held with a large number of local stakeholders (see list of organizations and people met – Appendix 2).

7. During the following months (July-August) we continued to collect and analyze relevant information through Internet and by phone and email, as well as by means of a questionnaire on available information resources (see Appendix 3).

8. It is strongly felt that any set of ICT indicators must be interpreted in their economic and social context. Therefore, we included in our study a brief examination of the Nicaraguan economy and comparisons with similar countries in the sub-region and with Sweden.

A.2. Acknowledgements

9. The study was carried out in close collaboration with Mr. Hopmann. His valuable contribution is gratefully acknowledged. We also wish to thank all those we

interviewed and those who responded to our survey for their kind collaboration.

B. EXECUTIVE SUMMARY

10. Nicaragua is one of the least developed countries in the Latin American & Caribbean region. It suffers from chronic economic problems and a high proportion of its population (68%) lives below the poverty level. Generally, public schools don't have any computers for use of the students (although there is currently a project which plans to furnish 65 public schools with computer labs). There are only some 80,000 computers in the whole country. Consequently, the vast majority of the population is still computer illiterate.

11. The government is aware of the potential of ITC as tools for development and almost all of the governmental entities use computers more or less extensively. A number of ICT projects have been initiated in various sectors; virtually all of them funded by grants or soft loans from international development agencies.

12. One of the most important of the ICT projects is the Integrated System for Financial Management and Auditing (SIGFA). At this point in time the system consists of more than 200 registers for financial management in the various government units. The integration of the various Government information systems on the basis of this platform would improve the government's efficiency and transparency considerably. If there were an adequate national telecommunication infrastructure, the SIGFA network would offer an excellent platform for government-on-line (e-government). The SIGFA project has also contributed to train government employees.

Development of national ICT strategies and policies

13. The National Commission for Science and Technology (CONICYT) is developing national ICT strategies and policies but the process is very slow. There is still a lack of national standards and guidelines for hardware and software. Policies and regulations regarding ICT related issues, such as data security and integrity, for example need to be developed. The absence of a national policy and strategy affects adversely coordination between the ICT projects, at national level, as well as among the concerned development agencies. This results in duplication of effort, interoperability problems and in high training and maintenance costs. A national ICT policy and strategy is a condition *sine qua non* for a harmonious ICT development. This is an area where assistance by development agencies could have very positive impact.

Telecommunication infrastructure

14. International connectivity is achieved through the Central American Regional microwave Network, which is also connected to the submarine fiber optic cable systems MAYA-1 in Costa Rica and COLUMBUS in Mexico, both on the Pacific coast. Several satellite communication system operators also offer international transmission capacity.

15. However, the available international capacity (bandwidth) is insufficient to satisfy the demand. To keep the tariffs at an acceptable level, Internet Service Providers (ISPs) frequently oversell the expensive international bandwidth to their clients in Nicaragua, which slows down the transmission speed very significantly even where the quality of the national network would allow for high-speed transmission. This limits considerably

the usefulness of ICT, and particularly of Internet services in Nicaragua.

16. Since about two years the submarine fiber optic cable ARCOS-1 lands in Puerto Cabezas and Bluefields on the Nicaraguan Atlantic coast. The construction of the backhaul from Bluefields to the national network, which is still missing, and the construction of the planned Central American regional fiber optic network would improve this situation significantly.

17. The construction of a national Internet backbone and Internet exchange would improve the speed of national Internet traffic but the insufficient capacity of international links would continue to be a bottleneck if this problem is not solved.

18. The national network is essentially concentrated to the Pacific Rim and the adjacent regions. There are extensive areas with low population density, which don't have any telecommunication infrastructure. In Managua there are two metropolitan fiber optic cable networks. One of these, the SIGFA metropolitan ring is a high-capacity ATM/DSL network with four nodes with DSL connections, which could offer high-capacity links to other operators but still doesn't. There is, however, a bi-directional, fairly extensive fiber optic cable network for cable TV, which offers capacity to IPSs and corporate Internet clients.

19. In general, the capacity of the national transmission networks is limited and insufficient to satisfy the demand for telecommunication services. They need to be improved and extended to the large regions in the north and east of the country, where there is currently no telecommunication service in many places.

20. There are plans for the development of telecommunication infrastructure. However, in general, these plans aim at increasing the capacity of existing networks or at extending the network only to areas with high population density.

21. Telecommunication operators should take advantage of the opportunities to extend the coverage of the telecommunication network offered by the construction of the new electrical power supply network – the ENTRESA an SIPAC networks – both of which include the installation of fiber optic cables.

22. The quality of the local network varies considerably. In many places the quality is so poor that it is impossible to access the Internet at acceptable speed.

Telecommunication policy and regulatory framework

23. The National Telecommunication Company (ENITEL), which was privatized in 1996, has the monopoly of the fixed-line telephony, including leased lines, until 2005. There is free competition in the markets for mobile cellular telephony, data transmission and Internet services.

24. Until June this year there were two mobile communication operators (using AMPS and D-AMPS technology), with coverage essentially in high population density regions in, and adjacent to the Pacific Rim. ENITEL has a license at the national level and will initiate it mobile telephony service (GSM) this year. There are 12 data transmission operators and 17 ISPs registered by TELCOR.

25. The regulator, the Nicaraguan Post and Telecommunications Institute (TELCOR),

appears to be competent but some ISPs claim that the current telecommunication regulations regarding interconnection conditions are not sufficiently clear.

26. It is very difficult indeed for private sector actors with limited resources to obtain the capital needed for construction of their own networks in the financial market of Nicaragua and interest rates are very high. As mentioned, current regulations do not allow other operators than ENITEL to combine fixed line telephony with other telecommunication services. This, too, reduces drastically the profitability of any network extension project.

27. It is recommended that the Government increase its efforts to stimulate competition in the telecommunication sector. This would include reviewing current regulations and helping new actors to obtain credits for telecommunication infrastructure projects.

Access to telecommunications and the Internet

28. As indicated above, access to telephone lines is essentially limited to the densely populated areas in the Pacific Rim and adjacent regions. In any case, only a tiny fraction of the population can afford their own telephones. The number of Internet users is estimated to only some 50,000, most of them in the capital Managua.

29. However, the number of Internet cafés is growing, which improves access somewhat in Managua and some other cities. There are also several projects, installing or planning to install telecentres or telekiosks in various population centers in order to improve the accessibility to information systems developed and to the Internet. Until now, these projects appear to be implemented in a fragmented way and without much coordination. Shared use of the infrastructure would enable a larger coverage of centers for public access to computers and Internet with the available funds.

30. Sustainable telecenter models must be explored which allow the poor to benefit from the telecenter services and participate actively in the information society. Telecenter franchise chains or cooperatives could improve the profitability of telecentres through economy of scale. Micro finance facilities are needed to enable local operators to invest in telecentres.

31. Current models generally assume that the revenue needed to sustain the telecenter has to come exclusively from the individuals using the telecenter or from subsidies from the state or some NGO. Different schemes of subsidies to enable poor people to use the centers have been proposed, but can the government afford to subsidize a substantial part of the population during an extended period of time?

32. By offering a wide range of service and products, using the same infrastructure and personnel, telecenter operators can generate additional revenue streams, which could enable them to reduce tariffs for Internet access, for example. Voice telephony service is generally a very important source of revenue for telecentres. If telecentres were allowed to mix data communication services with basic telephony service (or IP telephony) their profitability would improve sustainability.

33. Information and knowledge *suppliers*, particularly the Government but also NGOs and the private sector could pay for the use of telecentres to disseminate information and other services. This would be justified if, by using the telecenter, they reach more

clients/customers and improve their efficiency and effectiveness and, thus, achieve savings elsewhere.

34. However, even if (some) telecenter services could be provided free, or at tariffs affordable to the many people below the poverty line, the very high rate of functional illiteracy (more than 50%), means that the majority of people could still not benefit directly from access to ICT.

35. Consequently, the digital divide can only be (partially) bridged by using intermediaries for many years to come. Besides information workers, teachers, lawyers, for example, rural community radio stations, associated with telecentres, could also be used as intermediaries.

Content development

36. The various projects with an ICT component have digitalized many registers and other information resources and, thus, created content, which is useful (mainly) for government entities.

37. However, the majority of the registers in Nicaragua and other information resources are not digitalized and there is hardly any Nicaraguan Internet content, which is useful for the general population. The existence of content that meets the needs of the population is a necessary condition for the demand to grow. This, in turn, would increase the supply of relevant services and content. The development of relevant content is a huge task, where international development agencies could make a very useful contribution, for example, by supporting the development and adaptation of distance learning material and health information.

Human resources

38. The universities and technical training centers produce ICT engineers and technicians in sufficient quantity to meet the current needs. In the capital the labor market for ICT technicians is saturated but in rural areas there are hardly any qualified ICT technicians.

39. In most cities there are sufficient numbers of technicians for operation and maintenance of computers and LANs. However, there is a lack of people with the knowledge and experience required for more advanced tasks related to ICT.

Activities required to accelerate ICT development

40. In summary, the report indicates the following areas where more work is needed in order to accelerate ICT development in Nicaragua and where the assistance of international development agencies would have most impact.

- Development of national ICT strategies and policies. This should be speeded up to provide a much- needed basis for the harmonious development of ICT in Nicaragua.
- Further development of the telecommunication infrastructure to increase the availability of international links and reach out to underserved regions. This may require the Government to review current telecommunication laws and regulations to stimulate competition. Development banks should reconsider their policies regarding loans for investments in telecommunication infrastructure.

- Promotion of the concept of Multipurpose Community Telecentres as means to achieve (more) universal access. Coordination, at national and international level, of current "telecenter" projects is needed to achieve shared use of the infrastructure, which would improve the sustainability of the planned telecentres.
- Development of more content, which meet the needs of the population at large. In particular the development an adaptation of distance learning material and health information, should be initiated as soon as possible.

C. BACKGROUND INFORMATION

41. Nicaragua is, next to Haiti, the poorest country in Latin America and the Caribbean in terms of BNP per capita. Table C1 present some key indicators for the Central American countries. Sweden, which has only 3.8 million more inhabitants than Nicaragua (but an area which is more than four times Nicaragua's) is also included to enable comparison with a developed country, that is among the most advanced in terms of use of ICT.

Table C.1. Some key figures for the Central American countries and for Sweden (2000)

	Nicaragua	Costa Rica	Honduras	Guatemala	Panama	Sweden
Population (millions)	5.1	3.8	6.4	11.4	2.9	8.9
Area km^2	130,668	51,100	112,890	108,889	72,990	450,000
Adult literacy %	66.5	96.6	74.6	68.6	91.9	-
Urban population %	64.7	51.9	46.9	40.4	57.7	83.3
GNI per capita - US$ (Atlas method)	400	3,810	860	1,680	3,260	27,140

Source: The World Bank

42. It may be noted that Honduras, for example, which has a population and geography, as well as other environmental conditions similar to Nicaragua, has a GNI (Gross National Income) per capita, which is more than twice that of Nicaragua and a higher percentage of literates.

C.1. Economy

43. In 2001 the tertiary sector - services – contributed with 45.4% to the PNB. Within this sector, commerce was the largest contributor (22.5%) followed by the Government (8.5%). The primary sector (agriculture, livestock, fishing, forestry) contributed with 32.8% and the secondary sector (industry, manufacturing, construction, mining) with 21.3%. For more details, see [1].

44. The Nicaraguan economy is in a bad stage. The Terms of Trade index was 67 in the year 2000 (1995=100) and the trade balance – the value of exports minus the value of imports – the same year was negative (-US$ 741 millions).

45. In 2000 the external debt was US$ 7,477 millions; approximately 50% loans from bilateral development agencies and 30% loans from the various units of the World Bank. The same year the country received US$ 320 millions in official grants officials y US$ 165 millions in official credits (source: Statistics of the World Bank). Virtually all investment in ICT, as well as in other infrastructure sectors are made with loans or grants from bilateral development agencies, the World Bank (WB), the Inter-American development Bank (IDB), the International Bank of Reconstruction and Development (IBRD), etc.

46. Non-Government Organizations (NGOs) have an important role in the Nicaraguan economy. According to [1] there are no less than 1,900 NGOs registered in Nicaragua. In addition, there are about 200 representatives of NGOs, headquartered outside the country.[1] One of the reasons why there are so many NGOs is that there many of them are actually operating more or less as private enterprise, but register as NGOs which gives them various advantages (exonerate from taxes, etc.).

47. More detailed information about economic activities and employment, as well as about the uneven distribution of wealth is given in [1].

D. EXISITING TELECOMMUNICATION INFRASTRUCURE AND DEVELOPMENT PLANS

D.1. International connectivity

D.1.1. The Regional Central-American network (RRCA)

48. The Regional Central-American Microwave network (RRCA) connects the countries in this sub-region. In has a capacity of 128 E1 systems. Currently there are 25 E1 free but it appears that the Nicaraguan Telecommunication Company (ENITEL) so far has not facilitated the use of this free capacity by other operators, which has resulted

[1] According to CONICYT there are more than 3,000 NGOs with representatives in Nicaragua.

in a sanction from the regulator, the Nicaraguan Institute of Post and Telecommunications (TELCOR)[2].

49. There is a plan to install a Central-American fiber optic network as an integral part of the new electrical power network project. If this projects implemented the RRCA will be converted to an alternative route to guarantee redundancy.

D.1.2. Submarine Cables

50. Nicaragua has access to two landing points of sub-marine fiber optic (FO) cable systems on the Pacific coast, located at Puerto Limón, Costa Rica (MAYA-1) and in Mexico (Columbus II), which are connected to the Microwave network.

51. Since about two years, another sub-marine FO cable system, ARCOS-1, lands in Bluefields and Puerto Cabezas on the Atlantic coast of Nicaragua. Both of these landing points are provided with Add-drop Multiplex equipment (ADM), which would allow them to offer carrier services in these places.

52. However, the backhaul to connect ARCOS-1 with the national network is still missing. Representatives of ENITEL say that they are in the process of technical planning of the backhaul to Bluefields, approximately 383 km from the capital Managua. Three are also other actors (data transmission operators, ISPs and cable TV operators) who would like to construct this link. ENITEL did not take advantage of the opportunity that was offered to them to connect to the submarine FO cable system at the outset. Currently the company NICATEL, which has acquired this license, is negotiating with ENITEL about this issue.

D.1.3. Satellite communication systems Microwave networks

53. Several companies offer carrier services by satellite. Among those are INTELSAT, SATMEX, New Skies, GlobalStar and General Electric. Nevertheless, is seems that the offered capacity is limited and consequently expensive.

D.2. National networks

54. Most of the public switched telecommunication network (PSTN) consists of microwave links, some of which are still analogue. There are also FO and coaxial cable networks for cable TV and a Multi Access Rural (MAR) Communication System. Additionally, there is DOMSAT station with some VSATs installed.

There is an international telephone exchange and 85 switching centers at other levels with a total of 224,283 lines installed (67,826 free) in Nicaragua. 99.3% of the network is digital

55. . There is no national Internet exchange, nor a national Internet backbone.

D.2.1. Microwave networks

56. The *Interurban Digital Ring* is the Microwave network that interconnects

[2] In July ENITEL was sanctioned by TELCOR for anti-competitive practices and abuse of its dominant position by refuse to provide interconnection and access to telecommunication service operators.

ENITEL's principal switching centers, located in Managua, León, Estelí and Granada.

57. The capacity of this network needs to be increased and there is a project for installation of a new FO network to satisfy the current and future needs for transmission capacity in the capital Managua.

D.2.2. Fiber Optic (FO) networks

58. Presently there are 511 km FO cable installed in the whole country, among those the Granada-Masaya-Carazo ring and short interurban links, installed to substitute old copper cable, which was damaged or insufficient.

59. *The Managua Digital Ring* interconnects the switching centers in Managua and the satellite earth station. This FO ring doesn't have the capacity required to satisfy the growing demand for telecommunication services.

60. ENITEL plans to install this year a new Synchronous Digital Hierarchy (SDH) FO ring for the city of Managua. This network will support IP, data transmission and telephony and will add 45.000 lines in the capital.

61. The *ATM/DSL Metropolitan network* (installed by the SIGFA project, see section I.1) was designed as a communication platform for centralized control of financial and administrative management of the various governmental institutions located in Managua.

62. This network connects 4 principal nodes by means of a FO STM-1 (155 Mbps) ring. La optical fiber has 24 pairs, of which only four are used at present. Each node, with a capacity of 19 Gbits, offers at least 20 XDSL connections. Currently 32 institutions are connected with ADSL (2-7 Mbps) and Frame Relay (2 Mbps).

63. As part of this project local networks for SIGFA, are installed in some institutions and connected to local network, when existing.

64. The SIGFA network comprises a centrally located Firewall and there is some redundancy built into the FO ATM network. Moreover, there is a contingency dial-up link at each of the 32 points (56 Kbps MODEM) capable to manage 5 simultaneous sessions. Soon a back-up system, which was "forgotten" initially, will also be installed.

65. The physical transmission layer of the SIGFA network is managed by ENITEL. Currently the IP layer is managed by the Ministerio de Hacienda y Crédito Público.

66. ENITEL plans to connect this network with the Managua Digital Ring, which will increase the number of access points and extend this network to León, Granada, Chinandega, Matagalpa y Estelí, with financing from the World Bank. Already there is a communication infrastructure with transmission speed up to 128 Kbps in these cities, financed by the project.

67. The SIGFA project uses only 40% of the capacity of this network. Naturally everybody seem to agree that this network could be used also for other purposes, e.g. as a platform for e-government) and by other operators. However, until now there is no agreement between the regulator TELCOR, the operator ENITEL and four other interested operators regarding the conditions for such use [1].

D.2.3. The Multi-Access Radio (MAR) network

68. A small rural telephony *Multi-Access Radio* (MAR) network serves some small localities in the Masaya, Granada, Rivas and Río San Juan Departments. The limited channel bandwidth of this system and its quality makes it practically impossible to use for dial-up access to the Internet.

D.3. Local networks

D.3.1. Cable networks

69. Most of the local networks (Local Loops) are made up of copper pair cables or coaxial cables. The quality varies a lot. A program for replacement of old cable was initiated but appears to be frozen since the privatization of ENITEL [1]. This means that many of the subscribers have access to the Internet only at very low speed (theoretically (theoretically 2,400 bps – 9,600bps), if at all.

70. In some isolated localities the old cable was replaced by transmission links with ISDN-B quality standards. Unfortunately ISDN services were not included in the specification for the corresponding switching centers. Therefore, the potential of this high quality transmission networks is still not fully utilized [1].

D.3.2. Mobile cellular communication systems

71. Until June two mobile phone companies were operating in the 800MHz band (Band A) using cellular systems with AMPS and D-AMPS standards. The total number of subscribers is about 175,000 and their coverage essentially limited to Managua and the Pacific Rim. None of the operators offers data communication services nor do they plan to do so.

72. ENITEL indicate that it will initiate its mobile telephony service based on GSM standards this year (2002) and are licensed to offer this service throughout the country. ENITEL estimates that it will have 100,000 subscribers by the end of the year 2004.

D.3.3. Wireless access networks

73. There are several companies that offer data communication services by means of wireless networks to corporate clients, mainly in the financial sector. In general these companies use spread spectrum technology for this service. This type of connectivity is also offered in Managua and in most of the Pacific Rim.

74. These wireless networks offer alternatives to the leased lines using copper cable, which is currently offered by ENITEL. [1].

D.3.4. Cable-TV and Hybrid Fiber Optic – Coaxial Cable networks

75. It is interesting to note that the number of cable-TV subscribers is larger than the number of fixed telephony subscribers.

76. The principal cable-TV operator, ESTESA, has a high capacity, bi-directional FO network working at 870 Mhz that offers up to 120 TV channels as well as added value services, such as data transmission and Internet access. Once the ENITEL monopoly is terminated (see section F.2), ESTESA intends to offer also basic telephony services.

77. Currently ESTESA has 286 km of FO cable installed in Managua, Masaya, Granada, San Marcos and Masatepe. In the near future this network will be expanded to León, Chinandega, Chichigalpa and Rivas. Next year ESTESA intends to cover also Estelí, Matagalpa, and Chontales.

78. Three Internet Service Providers (ISPs) offer their services through this network and there are three more who are interested in using this network. The other cable TV operators use unidirectional coaxial cable networks. [1].

D.4. Summary of the current situation and future perspectives

79. The limited availability of international capacity (bandwidth) limits considerably the usefulness of Internet services in Nicaragua. Therefore, priority should be given to the construction of the backhaul to Bluefields to connect ARCOS-1 to the national network and the construction of the new FO cable network for Central America.

80. In general, the capacity of the national transmission networks is limited and insufficient to satisfy the demand for telecommunication services. The capacity needs to be increased and the network should be extended to the large regions in north and east of the country, where, at present, there is no telecommunication service at all in many places.

81. Existing development plans generally aim at extending capacity of existing networks or to extend them only to localities with high population concentration.

82. The planned electrical power networks, the ENTRESA and SIPAC networks, mentioned in section E, include the installation of Fiber Optic cable for control and communication, which could be used to extend the coverage of public and private telecommunication networks. In the SIPAC project this has been foreseen but unfortunately not in the ENTRESA project. [1]

83. It is extremely difficult for new entrants with limited resources to obtain the capital needed to construct their own networks in the Nicaraguan financial market. According to one of the interviewed persons, Nicaraguan commercial banks require securities corresponding to three times the amount borrowed (assets in plant, own funds and personal guarantee).

84. The fact that, until the year 2005, other operators than ENITEL are not allowed to combine telephony with other telecommunication services also reduces drastically the profitability of and network extension project (see section F.3).

85. It is recommended that the Government makes more efforts to stimulate competition in this sector and facilitates the entrance of other actors, who wish to construct their own networks in order to improve the connectivity and increase the coverage. Bearing in mind the difficulties for local actors to finance investments in networks under the current financial market conditions, development banks should consider facilitating loans for this purpose.

D.5. ICT indicators

86. Table D.1 below shows some ICT indicators in the Central American (CA) countries and in Sweden. For Nicaragua we have obtained information for the year 2002 for the majority of these indicators. The indicators for Nicaragua for year 2000 are included to facilitate comparison with the other countries, as the World Bank has not yet published statistics for more recent years.

87. It may be noted that Nicaragua has less main lines per 100 inhabitants (teledensity) than any other CA country and, in fact, in all Latin America & the Caribbean. The number of installed lines has increased very little in the last years while the annual growth of the population is substantially greater (2.8%) than the average for the region (1.6% - average 1994-2000), which explains why the teledensity has diminished since the year 2000. Even though the number of mobile phones has increased rapidly in the last few years, Nicaragua continues to be the country with the lowest total number of subscribers per capita in the region.

88. Also the number of PCs per capita is low compared to other countries in CA.

Table D.1 – TIC Indicators in CA countries and in Sweden
(2000 unless otherwise indicated)

	Nicaragua 2002	Nicaragua 2000	Costa Rica	Honduras	Guatemala	Panama	Sweden
Main Líneas/1000 inhab	30	31	249	46	57	151	682
In the largest city	-	74	478	99	-	284	-
Waiting list (thousands)	100	108	35	170	-	-	0
Mobile phones/1000 inh	33	18	52	24	61	145	717
Tot. No. of Telephone Subscribers/100 inhab.[2]	6.3	4.9	30.54 (01)	8.33 (01)	16.17 (01)	35.33 (01)	152.54 (01)
PCs per 100 inhabitants	1.6[3]	0.96	17.02	1.22	1.28	3.79	508.7
Internet hosts/10,000 inhabitants[4]	4.3	4.20	20.79	0.49	5.67	26.99	825.14
Internet users (thousands)[5]	50	50	384	40	200 (01)	90	4,600 (01)
Internet users/ 10,000 inhabitants	98.5	98.5	933.63	61.68	171.13	317.01	5,162.74
Radio receiv./1000 inh.	-	277	775	395	79	299	932
TV sets/1000 inhabitant.	-	69	231	96	61	194	574

Source: World Bank, TELCOR, ITU and [1]

[3] An estimate of the number of PCs in Nicaragua in the year 2002, based on the No. of PCs imported, and considering the life of a PC arrives at some 80, 000 PCs or 1.6 PCs per 100 inhabitants [1].

[4] UIT statistics.

[5] Estimate by the ITU, based on that each Internet account is used by more than one person. Currently the number of Internet accounts in Nicaragua is about 17,000.

E. ELECTRICAL POWER

89. As shown in the map below, the electrical power distribution networks cover almost exclusively the southwestern part of the country (the Pacific Rim and adjacent regions).

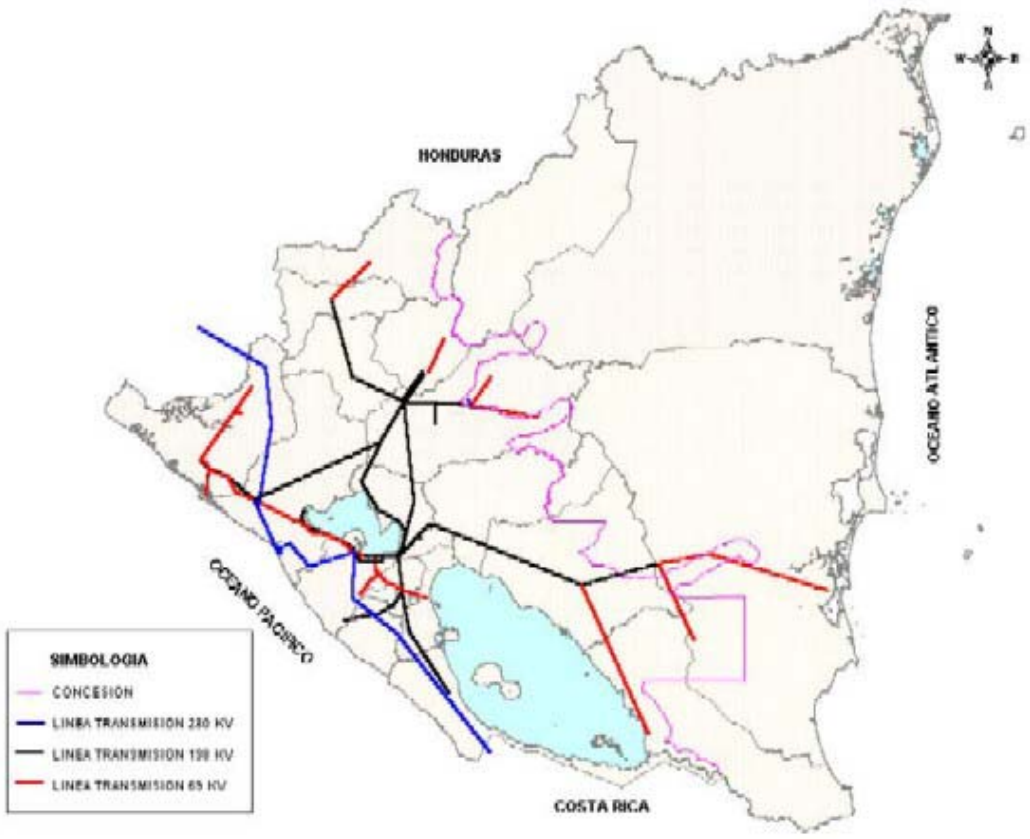

Fig. 1. Electrical power distribution networks and stations

E.1. Current situation regarding electrical power supply at the national level[6]

- 60% of the population in the Concession Area has access to electrical power.
- 21% of the population outside the Concession Area has access to electrical power.
- Approximately 70% of the households the Concession Area consumes a maximum of 100 Kwh/month.
- In the non-Concession Area the averagte consumption is 37 Kwh/month.
- National Electrification Index 48%. (2000)

[6] Source: Comisión Nacional de Electricidad – CNE – www.cne.gob.ni

90. This implies that there are still many localities without any electrical power. This complicates the development of telecommunication networks, particularly in the mountainous regions in the center-north of the country.

91. According to ENITEL, electrical power supply in Nicaragua, particularly in rural areas, is unreliable and very unstable and fault repair time has increased (generally there is no maintenance technicians in rural areas).

92. According the CNE statistics, in the Concession Area there were 8,818 interruptions in the electrical distribution network in the year 2001, or the equivalent 18,409 hours out of service.

E.2. Electrical power projects and development plans

93. CNE is developing a National Rural Electrification Plan, financed by the Canadian International Development Agency (CIDA). This project is one example of use of information technology, as this plan includes the creation of a Geographical Information System (GIS), which will allow them to manage geo-referenced electrification data.

94. There are two projects for renovation and extension of the electrical power distribution networks, presently in the operational planning stage.

- The renovation of 580 km of the national distribution network, managed by the Empresa Nacional de Transmisión de Energía Eléctrica (ENTRESA) and financed by credits from the Interamerican Development Bank (IDB)
- The new high-power interconnection Mexico-Panama as part of the PPP program (the SIPAC project), also financed by BID.

95. There are also various rural electrification pilot projects using different types of power generation, including hydroelectric power and solar power. Among these projects are the FCOSER/CNE project, financed by the Swiss Government and the UNDP project NIC/00/G42-CNE with preparatory assistance financed by the Global Environment Fund (GEF)

96. In June 2002 the FCOSER project had installed about 200 km of power lines that serve 2,316 households. The objective of the CNE-BID project is to install about 100 km of power lines, which will serve 1,838 households.

F. POLICY ENVIRONMENT AND REGULATORY FRAMEWORK IN THE ICT SECTOR

F.1. ICT Policy Environment

97. Many of the interviewed persons affirmed that the new President of the Republic of Nicaragua, Enrique Bolaños, is very much aware of the importance of ICT for the development of the country and assigns high priority to projects in this sector.

98. In 1999, when Mr. Bolaños was Vice-President, the Secretariat for Science and Technology and the National Commission for Science and Technology (CONICYT) were established and continues to work under the supervision of the office of the Vice-President. The considerable number of ICT project, initiated in recent years and financed by grants or loans from development agencies, bear witness of the priority that the Government gives to this sector (see section I).

99. The goal of the Government is to invest 1% of the Gross National Income in ICT. According to CONICYT, about US$ 80 millions per year are currently spent on ICT in Nicaragua, but precisely where it is invested is not very well known.

F.1.1. Development of ICT national Policies and Strategies

100. CONICYT has developed an outline of a national strategic plan - ALFA – aiming at reinforcing the Government institutions (see www.conicyt.gob.ni). Within the framework of this plan , it is currently in the process of developing a national ICT policy. This work includes the establishment of standards and norms. I further includes the formulation of new laws with reference to electronic signatures, copyright, data confidentially and security, etc. CONICYT is also revising the current telecommunication laws and regulations (see section F3).

101. At present drafts of laws with reference to some of the relevant topics have been prepared. The procedure for these proposed laws to be adopted is the following: the draft will be presented to the CONICYT members and then to representatives of other concerned sectors. After having been revised by them, they are submitted to the President and, finally, to the National Assembly of the Republic for adoption. It is estimated that this process will take 1 to 3 years.

102. Regrettably, CONICYT has been rather unproductive in the past, possibly due to lack of political direction during a long period (the Vice-President had to resign from his office to be a candidate for the Presidency).

103. Thus it was noted that, until now, there has been some duplication of efforts in the ICT projects and that there is a lack of standards and norms for technical platforms and for software used in the various projects. This affects adversely interoperability and increases the cost of training and maintenance.

104. Coordination between the various ICT projects needs to be improved at the national level as well as among the involved development agencies. The consequences of the lack of coordination are analyzed in [1] where it is concluded, among other things that:

“In the absence of national coordination, let alone among IDB and WB Task managers, each project in Nicaragua set out to resolve,by itself, its connectivity problem ,..... Consequently, the cost estimates of individual solutions triples those of the neighbor Costa Rica.....

Precisely these high local connection costs hamper the coverage of the national territory, as the project budget for communication for each project only covers Managua and some parts of the Pacific Rim, while together they could easily have

provide a point of presence in all communities with more than 2000 inhabitants.... (Excerpts from [1] translated by the authors of this report).

105. The members of CONICYT, nominated in November 2000, are representatives of the Government, the universities, the private sector and civil society (NGOs etc.). CONICYT constitutes, in principle, an appropriate forum for coordination of the ICT projects and for the development of the national ICT policy and strategy, which is still missing. The Secretariat employs currently 11 persons, but there is no line for Science and Technology in the Government budget.

106. According to the CONICYT Director there is a strong resistance to change among many of the public service staff members.

107. Considering the above, it is recommended that development agencies support the process of ICT policy and strategy development. Efforts to improve the coordination of projects in this sector, at national level, as well as at the level of the development agencies themselves should also be supported.

108. In addition to CONICYT, there is the Coordination Unit for the Public Sector Reform and Modernization Program (UCRESEP), established to give technical and operational support to the Executive Committee for the Public Administration Reform (CERAP). UCRESEP is in charge of the financial administration and accounting for all the government projects executed within this program. This includes the following projects, almost all of them with an ICT component.

- Vulnerability reduction and prevention of disasters;
- Telecommunication sector reform;
- Support for the privatization of ENITEL;
- The "Competitiveness" Project– PROCOMPE (development of clusters, centers for management development and telecentres for SMEs;
- Technical assistance to Modernization of the Economy (including the SIGFA project and its follow-up);
- Information System for the Civil Service (SISEC).

Brief descriptions of some of these projects are given in section I.

109. Currently UCRESEP has a staff of 12. It does not have a permanent status, given that it is financed by the World Bank credits for the projects of the Reform Program.

110. UCRESEP, too, is working on the law regarding access to information. It is contemplating the creation of an office for management of informatics in the public sector, which would be a permanent government unit for coordination and for policy development.

111. There are also plans to create government centers to attend to the general population. This implies creation of physical space, so that representatives of the various government entities could be located in one single building.

112. UCRESEP has produced a Catalogue of the Government's Services and Transactions and estimates that 85% of the transaction is centralized to the capital

where 25% of the population lives.

F.2. Computer literacy - current use of ICT

113. With only some 80,000 PCs in the country, clearly the vast majority of the population doesn't have any experience of using such tools. The current government policy is to apply 15% VAT plus US$ 20 for transaction costs for computer imports. Although this makes computers expensive, computer imports are comparatively favored in view of the fact that 5% - 60% import duties are applied to other goods, the higher figure in case of luxury articles. Only goods of primary need are completely exonerated from import taxes in Nicaragua.

114. There is a large number of universities, as well as other educational and training institutions where the students learn something about computers and how to use them. Some of the private primary and secondary schools also have computer labs (see section J).

115. There is an increasing number of telecentres and cybercafés (see Appendix 5), where the population has access to computers and can learn something about how to use them.

116. Nevertheless, the large majority of the population is still computer illiterate.

F.2.1. Availability and use of computers in the public sector

117. According to CONICYT, the majority of the some 80,000 government employees are capable of using computers for administrative tasks and many of those who work in government entities, located in Managua and in the Departmental Capitals have access to computers and the Internet. The majority of the government entities, located in Managua have their web sites (see the description of the SIGFA project in section I.1 and www.ibw.com.ni)

118. In June 2001, 86 of the municipalities outside Managua were equipped with at least one computer (see Appendix 4). Additionally, the second phase of the INIFOM Protierra project, which is currently being implemented, is providing one computer and one printer to 43 municipalities.

119. However, there is still a need for more PCs in the government entities. Thus, the there were 8 persons per PC in the central government entities and many of the PCs are outdated. Due to the lack of standards there are many different makes of PCs, with different versions of operating systems and a variety of software. All this complicates the exchange of digitized information and increases the cost of maintenance and training.

F.2.2. Availability and use of computers in the private sector

120. According to CONICYT, private large and medium size enterprises are usually more computerized than the public sector institutions. But only 5% of the enterprises are large and 10% of medium size. In the remaining, (85%,) small (micro-) enterprises the employees generally don't have access to computers for their work (though, sometimes, they may have one for administrative work).

121. Most of the banks in Nicaragua, allow their clients to carry out transactions within their own accounts and view the status of their accounts and deposits by means of the Internet. According to CONICYT, relatively many people use ATM machines, in spite of the fact that many of the machines seem not to be working properly.

122. Quite a few enterprises, institutions, NGOs, media, travel agencies, and professionals, offer their services and products (information, training, legal counseling, ICT related services and products, etc.) through their own websites. Out of the some 8,000 private enterprises in Nicaragua, 536 have their own website with "local" or foreign content, though not all of them are active (see section K and www.ibw.com.ni or www.xolo.com.ni).

F.3. Legal and regulatory framework

123. A regulatory body, El Instituto Nicaragüense de Telecomunicaciones y Correos (TELCOR), was established in 1992.

124. The General Law of Telecommunications services, adopted 1995 and complemented by other laws, adopted in subsequent years, govern the telecommunication sector (see www.telcor.gob.ni).

125. The Nicaraguan Telecommunication Company - ENITEL - has the monopoly of basic local, interurban and international telephony services, as well as on leased lines until 2005. ENITEL, which was privatized in 1995, is presently owned by the EMCE (Honduras) consortium associated with SWEDTEL (Sweden) - 40%, the employees - 11% and the Nicaraguan Government - 49 %.

126. There is free competition in the mobile telephony, VSAT, Cable TV, data communication and Internet services markets. However, the interviewed Internet Service Providers (ISPs) complained because they feel that the law is not quite clear regarding interconnection conditions and access to the network and that ENITEL subsidizes (cross-subsidies) its own PSI (TELEMATIX) and exercise other anti-competitive.[7].

127. Drawing on the experience of Peru (and Chile), TELCOR is currently developing policies, regulations, structures and conditions for the implementation of a Telecommunication Investment Fund (Fondo de Inversión de las Telecomunicaciones - FITEL). This fund provides seed money for the development and implementation of a strategy for rural telecommunications development.

128. This strategy implies that, based on a selection of localities by size of population, level of poverty and with maximum social benefit and profitability to guarantee sustainability, through a public offering, operators are invited to make their bid for provision of at least one public pone in each selected locality. The bidder who asks for the least subsidies will win the license. The goal is to satisfy the needs in communities with 500 to 1,500 inhabitants (which is beyond the obligation of ENITEL).

[7] In July 2002 ENITEL was sanctioned by TELCOR for anti-competitive practices and abuse of its dominating position in provision of interconnections and access for Telecom. Service operators.

129. The seed money will also be used for a pilot community telecenter project (see section I).

G. TELECOMMUNICATION OPERATORS

G.1. Basic telephony operators

130. In practice, ENITEL dominates the telecommunication market. Currently it has 150,000 fixed line subscribers. ENITEL offers data transmission services through its X25 network, and dedicated lines. It also offers Internet services to some 5,000 subscribers through its division TELEMATIX. Tariffs, authorized by TELCOR, are published at the latter's website (www.telcor.gob.ni).

131. The concession with ENITEL stipulates that ENITEL must increase the number of fixed lines to a total of 300,000 by the year 2004. It also stipulates that should provide all communities with more than 1,500 inhabitants with telecommunication service in the next five years. ENITEL has invested US$ 2.5 millions in an earth station and 170 VSATs and could use some of these to comply with the above. Most of the VSATs are still in the store and the chosen technology supports only voice transmission. Some of these VSAT (10 a 15) are installed in isolated zones but are still not operational according to one of the interviewed ISPs.

132. ENITEL has not made any major investment for network extensions in the last few years. Since the privatization of ENITEL the number of fixed lines have increased very little.

133. In Mach 2002 there was also a total of 54 Internet Access Centers (telecenters or telekiosks and Internet cafés) installed and operated by governmental entities, NGOs and private enterprise (see Appendix 5). Some of these offer IP telephony (through the Internet) which is "not legally prohibited, nor allowed" according to one of the interviewed persons.

G.2. Mobile telecommunication operators

134. In June 2002 there were two mobile pone operators: Bellsouth and Teleglobo[8]. Bellsouth, who dominates this service with approximately 170,000 subscribers, cover the Pacific Rim and adjacent regions and Teleglobo had a license for the rest of the country. Bellsouth's tariffs are published at the TELCOR web site (www.telcor.gob.ni).

135. ENITEL has a mobile telephony license in 1,800- 1,900 Mhz band with national coverage and will initiate this service by the end of this year.

136. GlobalStar also offers mobile telephony communication services by satellite in the northeastern region where there is no telecommunication infrastructure but has very few subscribers.

[8] En July 2002 Teleglobo's license was cancelled by TELCOR.

G.3. Data communication operators

137. In June 2002 there were 12 data communication operators (see www.telcor.gob.ni). Among those who offer this service through Microwave networks are DATATEX, SISTEMATICA and ENITEL. For example, SISTEMATICA of BANCENTRO is a very extensive private network of a bank that offers service also to third party clients.

G.4. Internet Service Providers (ISPs)

138. Presently there are 17 independent ISPs, registered by TELCOR (see www.telcor.gob.ni). Each of these has their own type of access to the Internet. ENITEL, which has two routes via USA, offers dedicated lines to the ISPs and end users. The total number of individual accounts is currently about 14,000 and the number of connections by leased line is approximately 300.

139. Eight of the ISPs have direct international connections by satellite or, more recently, through the landing point of MAYA-1 in Costa Rica via the Regional Microwave network RRCA.

140. However, none of the eight ISPs, who have a direct international connection, has their own connection to the Internet Backbone. Each of them is, in turn, a client to a global operator, such as UUNET, Cable & Wireless, Global One, Telescape o Interpacket. The nine other ISPs resell internally the capacity of the ISPs with international connectivity.

141. Most of the ISPs have points of presence (POPs) only in the capital Managua and surroundings. Only four ISP offer service outside Managua, and only two of these offer their service in a few regional Departments. Approximately 11,000 (78%) of the individual accounts and some 250 (83%) of the dedicated line connections are in Managua [1].

142. There is no Internet Exchange (CXI) in Nicaragua and no national Internet backbone. Some of the principal ISPs have a peering arrangement and are connected by Fiber Optic cable (1 Gbps) at the national level. This means that in these cases the national traffic doesn't have to transfer by the international network.

143. Due to the lack of supply of transmission capacity prices of international links are high – between US$ 10,000 y US$ 18,000 for the equivalent of an E1 link.

144. To be able to offer services at tariffs acceptable to the individual clients (although too high for the majority of the population), ISPs are obliged to oversell their international bandwidth up to a ratio international bandwidth to bandwidth sold nationally of 1:32, instead of 1:16, which normal practice.

145. Connections with guaranteed minimum bandwidth are available but are expensive. For example, the cost of a 64Kbps guaranteed minimum bandwidth is US$. 640 - US$.800 per month. with reference to this situation [1] concludes:

146. *"For this reason, in practice the real speed of dial-up connections rarely goes beyond 4 a 6 Kbps. This limits tremendously the usefulness of local (theoretically) more*

rapid connections using the most advanced modems or DSL and connections through cable TV networks. Some ISPs plan to reduce this problem using web-caching or down-stream-only satellite connections" (excerpt from [1] translated by the authors of this report).

147. 14 ISPs and four public universities have established the Nicaraguan Internet Association (AIN). If AIN invest in infrastructure prices would be brought down according to one of the interviewed IPSs.

148. Five of the biggest ISPs - ALFANUMERIC, IDEAY, IBW, Netport y Cablenet. – have together a total of some12,000 Internet subscribers (86%). Below some of the information obtained from the four interviewed ISPs is summarized.

G.4.1. ALFANUMERIC

149. ALFANUMERIC is present in the Pacific Rim and in all the Department Capitals except Puerto Cabezas y Bluefields. All its national traffic is transmitted within its microwave network. It has to satellite communication providers.

150. According to ALFANUMERIC, which has 68 employees, it is very difficult to find qualified personnel. The students in informatics engineering, who graduate from the universities, are oriented towards LANs, but don't have sufficient knowledge about WANs and telecommunication networks. There is a lack of qualified manpower for maintenance of data networks. The *quantity* of ICT technicians is sufficient but the *quality* is low. The technicians have limited knowledge and, above all, lack practical experience.

151. ALFANUMERIC brings international consultants for the practical training of their staff. Luckily there is very little turnover of personnel.

G.4.2. IBW

152. IBW has some 50 clients with dedicated lines and 8,000 email accounts. It is present in 12 Departmental Capitals and estimates that it has a market share of about 35%. IBW's website (www.ibw.com.ni) has links to the government entities websites and to many other Nicaraguan content providers.

153. Its tariffs for different options are given at its website. For a dedicated 64 Kbps connection IBW charges US$ 300 per month.

154. According to IBW, Nicaragua has currently a international capacity (bandwidth) of 34 Mbps downstream and 17 Mbps upstream for the ISPs but the cost of the links offered by ENITEL is considered too high.

155. The IBW Director is very conscientious of the lack of access in rural areas. He believes that the only way to provide access in such areas is by means of telecentres, but that it will be very difficult to sustain such telecentres in thinly populated areas, where there is presently no telecommunication infrastructure.

156. IBW reckons that the communication costs will be some US$ 100 per computer and month for a center with 10 computers and a VSAT (in this case GILAT with 64 Kbps upstream and 34 Kbps downstream).

G.4.3. IDEAY

157. IDEAY manages 30 enterprises with dedicated lines and 60 clients connected by cable. 1,500 clients have web accounts, 80 clients publicity accounts and some 500 have email accounts. IDAY has a 2 Mbps connection using the MAYA-1 submarine fiber optic cable network. They reach the landing point in Costa Rica through the RRCA (2 Mbps). The monthly cost of the international link is about US$ 10,000. For a 64 Kbps leased line ENITEL charge US$ 300 per month.

158. According to IDEAY, the price of VSATs has gone down as the more capacity is now offered through the by submarine fiber optic systems. The monthly cost for a VSAT with 2Mbits downstream is now US$ 8,000. Currently there are various companies that offer satellite communication services.

159. IDEAY has POPs in Managua, Carazo y Chinandega. Their monthly tariffs are: US$ 8.00 for email and web access, US$ 15.00 for Internet access from 6:00 pm to 7:00 am and 24 hours email weekends and US$ 25.00 for unlimited services.

160. The information available on its website (www.ideay.com.ni) include climate, movies, editorials, hotel info and yellow pages. On the average the clients access 8 pages per visit.

161. According to IDEAY, the main problem that ISPs face is the very high cost of the international links. IDAY worries that if ENITEL constructs the backhaul between Managua y Bluefields to connect to ARCOS-1, the ISPs will have to buy links of 45 Mbps very expensively.

G.4.4. CABLENET

162. The number of CABLENET's Internet clients has reached some 2,000, in just about 2 years. The cable TV operator, ESTESA, has approximately 60,000 subscribers. More than 20% of these asks for Internet services through the cable where this is available. Internet service by cable (e-cable) costs US$ 40 - US$ 1,000 depending on the bandwidth.

G.4.5. Summary of the ISPs and their clients' problems

163. In summary, the following problems must be resolved to increase the supply and reduce the cost of Internet services.

- "*The lack of links from the national network and/or from central areas in the Pacific area to the two landing points of the ARCOS-1 .....*
- *The high costs – 10 times those in the USA – of external digital links.*
- *The lack of an alternative high capacity communication network with national coverage ....*
- *The lack of data transmission networks, like ATM, Frame-Relay or IP-backbone, between the Capital y and the regional Departments, which obliges each ISP to operate through individual dedicated lines, which hampers economy of scale.*
- *The lack of a high capacity CIX (or peering ring) between all the ISPs at the national level and mutual support arrangements between the ISPs.*

- *The absence of local POPs in the regional departments, the mounting of which would increase significantly the operational cost per customer and therefore is unattractive for the ISPs.*
- *The complete lack of adequate and economic solutions for clients or small groups of clients in rural areas. Again there are no incentives for local ISPs to implement appropriate solutions.*
- *The lack of transparency regarding service and price, i.e. even for an expert client it is difficult to tell what quality of service, within and outside the country the ISP guarantees and at what price*. (Excerpts from [1] translated by the authors of this report)

G.5. Other telecommunication service operators

164. In June 2002 there were also three radio paging operators, 10 community repeater operators, four trunk link operators y 250 private radio communication operators. In addition there are 124 radio broadcast operators, 69 operators of cable TV and 6 public TV. (Sources: TELCOR and [1]).

H. ACCESS TO TELECOMMUNICATIONS AND TO THE INTERNET.

H.1. Telephony

165. As mentioned earlier, the coverage of the national network is rather limited. 60% of the fixed telephone lines are in the capital Managua. According to information compiled from INIFOM and TELCOR, 96 municipalities (63%) are equipped with telephone main lines, 39 municipalities (26%) have remote access or public phones only and 16 municipalities (11%) don't have any access to telephones. A demand study carried out by TELCOR, indicates that a total of 673 localities were without telephone in the year 2000 [2].

166. This implies that a large proportion of the population outside the cities does't have access even to a telephone line, let alone to computers.

167. Mobile telephones offer a solution in some localities where there are no fixed lines but, again, only in cities and densely populated areas (the Pacific Rim).

168. Even where the telecommunication infrastructure exists the majority of the population can't afford the luxury of a telephone. Many subscribers – nearly 35% - use their phones only to receive calls and for collect calls in order to minimize the bill to the fixed costs.

169. Many of those who don't have their own phones use public phones, of which there were 3,208 in the year 2001, or use phones of friends. Thus, 53% of a sample in the TELCOR study use public telephones and another 24% use their friends' phones. [2].

H.2. Internet

170. Individual access to Internet is even more limited than access to basic telephony for the following reasons:

- Internet subscriptions cost as much or more than in industrialized countries The average cost of a 20 hours dial-up subscription is about US$ 25 per month, plus the cost of local calls already exceeds the total monthly income of many people in Nicaragua.
- There are POPs only in Managua and in the majority of the capitals of the regional Departments. In other parts of the country dial-up access has to be by interurban calls, which costs 3 - 4 times the local calls.
- In addition to telephone lines also computers are needed, which only a very tiny percentage of the population can afford to buy.
- The quality of the local (non-renovated) network doesn't permit connection to the Internet at acceptable speed.

171. As mentioned, even where it is theoretically possible to obtain 64 Kbps or higher speed connections, the speed is drastically reduced because of the limited available international bandwidth. Also congestion of traffic in the national network limits the speed in many places.

172. Thus, *"approximately 72% of the municipalities and 42% of the population will continue without any technical possibility to connect to the Internet by means of the PSTN. The percentage of people without technical means to direct access increases to more than 60%, if the situation of the rural population is also taken into account" (*excerpt from [1] translated by the authors of this report).

H.3. Access by means of telecentres

173. One way of increasing access to the Internet is through public access centers. As mentioned earlier, there are an increasing number of Internet access centers (telecentres, telekiosks and Internet cafés). These centers enable the population in Managua and a few other population centers to access the Internet at a more reasonable cost - between 0.80 $US and 1.50 $US in subsidized centers and 1.50 $US up to the extreme of 7.50 $US for commercial centers (see Appendix 5 y [1]).

174. As we have seen, almost all the projects described in section I have funds for investment in Internet access centers. These telecentres and telekiosks will contribute to increase access to the Internet and extend somewhat the geographic coverage of such access. However, in several cases different projects are implementing telecentres in the same locality, each of them for a specific purpose and client group. Clearly the sustainability of such centers, particularly in isolated thinly populated areas is very doubtful.

175. In rural areas or deprived urban areas, *shared* facilities, such as *multipurpose* telecentres, could provide the access to computers and the Internet, that the various ICT projects plan to provide in schools, health centers, telecentres for agriculturers and

SMEs and telekiosks for public access to government information.

176. The resources allocated for telecentres in the various sectoral projects would suffice to cover many more localities if the investments planned for equipment and software in each of them were used to create shared facilities, rather than each of them establishing some telecentres for exclusive use of a particular segment of society.

177. The majority the interviewed persons seems to share this opinion. Not withstanding, Apppenix 6 which lists of 176 centers installed and planned by some of these projects in 70 of the 154 municipalities in Nicaragua, shows that many of the municipalities will have more than one of these telecentres.

178. The increasing number of commercial Internet cafés indicates that they are profitable in areas with high population concentration. In the Nicaraguan context a telecenter with 10 PCs, with the high costs of Internet connectivity and electrical energy (air-condition is a must) and paying market costs for personnel and premises, has to charge a minimum of about US$ 1.50 per hour and computer to be sustainable, if there are no other sources of revenue generated by the same facility.[1]

179. Obviously, the vast majority of the population doesn't have the economic capacity to pay US$ 1.5- 3 per hour for Internet access, particularly when they can't see any direct economic benefits from such access. Nor do they have the knowledge and skills required to benefit from the resources available through the Internet.

180. To enable the poor to benefit from the telecentres, in the first place the users must be trained. Some of the existing Internet cafés offer free training in the use of computers and the Internet in order to increase their customer base. The introduction of computer courses in the public schools will, in a longer perspective, contribute to increasing the number of computer literates. It is nevertheless necessary to insist on that all the new telecenter projects must include training for those who need it.

181. Moreover, public services, such as education, health and e-government, have to be offered free, or at a symbolic price to the poor. This has to continue at least until they perceive that the use of ICT brings them some tangible benefits, e.g. enables them to reduce cost of travel to look for information, get and fill forms required for social security benefits and register property, or enables them to take advantage of vocational training opportunities. Obviously this requires that such services, which meet the needs and demand of the population, are developed and made available through the Internet.

182. If telecentres have to offer public services free of charge, for example, to people below the poverty line and/or to students in the school during half of the time, they have to apply tariffs for the remaining clients which exceed those currently charged by the majority of the Internet cafés. This is obviously impossible.

183. One (partial) solution could be that the government (rather than the individual client) pays the telecenter operator for its use of the center for delivery of public services. The use of ICT and the telecentres for the delivery such services could, in principle, improve the service and enable savings in personnel and in equipment. Use of ICT to support economic activities could contribute to economic development in the country and, thus, increase the Government's resources in a longer perspective.

184. To improve sustainability and profitability telecentres should also offer other services, such as coffee shop and kiosk business, selling and repair of ICT equipment, software and consumable, photocopying, administrative support for micro enterprises, etc. (some of which are already offered by existing Internet cafés).

185. Voice telephony service is another, potentially very important, source of revenue. Experiences from other countries indicate that revenues from such services contribute very significantly to make the centers sustainable. To allow for this before the ENITEL monopoly ends may require revision of the current telecommunication laws and regulations.

186. However, even if some telecenter services could be offered free of charge or at symbolic tariffs, the high rate of functional illiteracy (more than 50%) implies that the majority of people could still not benefit directly from access to ICT.

187. Therefore, the digital divide can only be bridged by means of intermediaries for many years to come. Such intermediaries (information workers, teachers, lawyers, etc.) have to convert the queries and oral inputs for illiterates to written words and numbers. They also have to translate the relevant information and knowledge obtained through ICT to voice massages. NGOs have an important role to play in this context.

188. Rural community radio stations, associated with telecentres, could also be used as intermediaries, with the additional advantage that they reach out to rural sparsely populated areas where telecentres are not viable. In future, voice recognition technology may reduce this problem and use of computer support, for example in telecentres, may also improve the efficiency and effectiveness of literacy campaigns.

189. Sustainable telecenter models must be explored which allow the poor to benefit from the telecenter services and participate actively in the information society. Telecenter franchise chains or cooperatives could improve the profitability of telecentres through economy of scale. Micro finance facilities are needed to enable local operators to invest in telecentres.

I. PROJECTS WITH AN ICT COMPONENT

190. The most important projects with an ICT component, implemented by the government and national organization, are described below.

I.1. Integrated System for Financial, Administrative Management and Auditing (SIGFA*)*

191. The Integrated System for Financial, Administrative Management and Auditing (SIGFA) was initiated in the end of 1995 with the objective to coordinate standards and procedures for budgeting, accounting and treasury operations of public funds, as well as information systems to effectively support the decision making process and internal and external government control (see www.hacienda.gob.ni/sigfa/index.htm).

192. The SIGFA project was initially financed by credits from the World Bank. Additionally, SIGFA recently received a grant of US$ 3.5 million for acquisition of

hardware and training plus US$ 2.5 million for the required security systems (back-up equipment, etc.) from the Netherlands. SIGFA's technical platform consists of a high-speed ATM ring. Technical information about the SIGFA network is given in section D 2.2.

193. Currently, all the more important government agencies (32), with headquarters in Managua, are connected to SIGFA and 23 of them have their own web site (see www.ibw.com.ni). In general, these web sites are professionally designed and provide information about the organization and activities of the entity. However, all of them are still passive in the sense that they do not offer on-line interaction with the institutions (e.g. forms and registers that could be completed on line).

194. The project includes equipment also for other ministries and government entities and user training. The network offers a very adequate platform for e-government and the project staff intends to stimulate the use of the network also for other purposes than financial control.

195. The first phase is now completed. There are 32 institutions, which interact on line with the central Government and the Budget of the Republic since six months. The system handles accounting, treasury and budget operation. SIGFA uses ORACLE and the system comprises already more than 200 registers.

196. The bidding for production servers is now completed. The system will address the 4 levels of administration in the country (from the central government to the municipalities) in order to decentralize financial management and now it has reached level 3. For example, the police (level 3), who depend on the Governance Ministry (level 2), are now using the system in a decentralized way. There is now a communication infrastructure that reaches Chinandega, León, Matagalpa, Estelí y Granada, at a speed of up to 128 Kbps, financed by the project.

197. Thus, it could be stated that a Government Intranet now exists, at least partially. In the agreement ENITEL has undertaken to extend this network to the regional departments.

198. In May 2002 discussions were initiated with the Social Emergency Investment Fund (Fondo de Inversión Social de Emergencia – FISE) and the Nicaraguan Institute for development of the Municipalities (Instituto Nicaragüense de Fomento Municipal - INIFOM) about the use of the SIGFA network. Both have great needs for the system. However, to be able to use the software they have to pay a license of US$ 80,000 per municipality.

199. The Contraloría General de la República has now started to use the system to do auditing in real time.

200. A system for automated payments of salaries for some government institutions is being developed. Each employee will have his/her own account, receive his/her paycheck and go the bank to cash the check. To this end discussion about collaboration with the banks have also been held.

201. SIGFA has asked the Instituto de Capacitación Centroamericano (ICAP) to

explore the possibility that universities open training careers for public administration.

202. The project has been criticized for not documenting adequately the development of software programs but SIGFA is now in the process of remediating this deficiency.

I.2. Pilot project for computer laboratories in schools

203. The Ministry of Education, Culture and Sports (MECD) is planning to install computer labs in 65 schools (16 primary, 47 secondary schools and two vocational training centers) of the 4,500 autonomous schools in the 153 municipalities of the country. 57 of the 65 selected schools are located in urban centers and the remaining ones in rural areas (see Appendix 6). This is a component of the Educational Reform Project.

204. The labs will have 20 high-end PCs (multi-media), connected to a LAN with Internet connection, two printers and one scanner. The teachers and students will be the main users of the labs but also administrative staff will use it to access the central MECD. However, there will be an average of 75 students per PC in the secondary schools, which implies that they will not have much access to the computers.

205. In the central Ministry there is an Intranet (Fiber optic cable) with 190 computers connected (62 with Internet access). MECD would like to extend this Intranet to the 19 Department Divisions of the country (each of which in general has 2-4 PCs), to facilitate the exchange of information and the management of the education system. Currently there are about 500 computer users in the MECD in the whole country.

206. MECD is exploring possibilities to connect all the participating schools by VSAT. The North American Company CyberStar has recently made a proposal for a VSAT system for this purpose with 19 kbs up-stream and 2 Mbps shared down-stream.

207. This project, financed by the Interamerican Development Bank, was recently criticized in a local paper, la Prensa. According to the critics the project spends too much for hardware (US$ 1,300 per PC). The specified equipment is too sophisticated and expensive in view of the needs of the students and the budget for education and the sustainability of the approach is doubted, particularly as the idea is to replicate this model on a large scale.

208. Representatives of MECD defend the project, saying that one should use the latest technology to enable high-quality distance education and that the difference in price of computers is not that significant. They nevertheless agree that it will be necessary to open the labs also to other users to make them sustainable.

I.3. The CONICYT/INATEC Internet kiosks project

209. INATEC implements a project (initiated by CONICYT) with the objective to install 2,000 “technology kiosks” in Nicaragua (for which there is not yet sufficient funding). Each kiosk will have 5 PCs with Internet access. Currently 65 kiosks have been installed up to now (see Appendix 6) and the project will continue until 2006.

210. By 15 August it is planned to install kiosks in 29 more municipalities where there

will be 3 to 4 VSAT stations, which should be installed in the coming 6 months.

211. The kiosks are expected to be self-sustained. INATEC suggests that they could charge 10 Córdobas (US$ 0.70) per hour and the kiosks should pay the salaries of the teachers of the end users. However, in view of the minimum price of US$1.50 per hour indicated in section H, one have to ask how these kiosks could be sustainable (unless the staff and the premises are paid for by some NGO).

212. The initial investment for these kiosks is financed by development agencies and then they will be given to NGOs, universities, religious congregations, etc. to operate as their business.

I.4. The Agricultural Information System of the Ministerio Agropecuario Forestal - SIA-MAGFOR

213. The objective of SIA-MAGFOR, is to "develop an inter-institutional, cooperative, opportune, decentralized and up-to-date agriculture information system which is accessible for the different actors in this sector as decision support, and to promote agro-fishery development" (see www.sia.net.ni). This is a component of the Agricultural Technology Project, financed by the World Bank.

214. The strategy includes:

- Institutional coordination;
- Reinforcement of its information systems and development of alternative mechanisms for the use and management of the current and demand oriented information;
- User training.

215. The institutional coordination involves awareness building and promotion of the concept. SIA works with different actors in the sector, signing collaboration agreements, and forming different committees, which support the SIA team. Information about some of these projects is available from SIA.

216. The Informatics Unit works along three main axes: a) development of a pilot information system b) development of a SIA Portal and c) development of alternative means of access to the system.

217. Presently SIA produces CDs and radio programs. In future the users will be able to access the information systems through telecentres in rural areas. Shortly. SIA-MAGFOR will open the bidding for four telecenters, which will be administered by NGOs or universities (see Appendix 6). SIA is discussing an alliance with INATEC, who is in charge of the afore-mentioned technology kiosk project, for the training of their users. Furthermore they are interested in strategic alliances with the PROCOMPE project and the TELCOR project for rural telecenters (described below).

218. SIA is a four-year project. Presently there are rural agriculture training centers. To train the end users of the system 50 groups of 20 technicians each will be created. Right now 50 teachers are being trained to become the trainers of these 50 groups. By the end

of June 8 of the groups will be connected to this training network. .

I.5. The "Competitiveness Project" - PROCOMPE

219. PROCOMPE was initiated by an agreement between the Central American countries five years ago. In Nicaragua the Ministerio de Fomento, Industria y Comercio (MIFIC) is in charge of the project. The overall objective of the project is to improve competitiveness of Small and Medium Enterprises (SMEs), among other things by means of an "Entrepreneur's Development Services" (EDS), based on ICT. The EDS will include training of entrepreneurs, market information, prices, etc. and, in a longer perspective, a platform for e-commerce.

220. The agreement with the World Bank, established three years ago, included the creation of telecentres for SMEs. Now this concept has been changed. Instead of creating new EDS access telecenters, PROCOMPE considers to reinforce existing or planned centers. For example, the existing Internet cafés could be accredited for access to the EDS and train the users in accounting, business administration, etc.

221. The project envisages creating a virtual EDS center, which would offer accredited training. The members will be able to pay with money or with e-bonuses. A document describing these new concepts is currently under development and should have been ready in July this year. An EDS portal is also planned.

222. In a pilot, which was implemented in Masaya, more than 100 SMEs were invited to attend an ICT demonstration. The responses to a questionnaire administered to the participants, indicate, among other things, that about 1% of them are prepared to invest in Internet access. PROCOMPE estimates that about 40% of them would be able to use Internet (70% had already used Excel, Word, etc.).

223. Continuity and sustainability of the project are concerns. Investment should start small and then gradually increase as the project advances

224. PROCOMPE feels that there is a need for Internet Points of Presence (POPs) in large areas of the country and that incentives must be given for IPSs to install POPs in regions where there presently aren't any.

I.6. The Health Ministry's Integrated Information System (SIMINSA)

225. SIMINSA was promote by the Nicaraguan Health Sector Modernization Project, of the Asociación Internacional de Fomento (AIF) and financed by the World Bank.

226. The general objective of the Information System is to provide support to the decision and action planning processes in the administrative and managerial areas of the Ministry of Health at central, SILAIS, hospital and health center levels.

227. SIMENSA comprises the subsystems for Service Production and Health Situation, Financial Resources, Material Supply, Health Regulation, Planning. Human Resources Administration, Investments and Humanitarian Support.

228. Presently SIMINSA has developed 20 modules, among those a data banks for

pharmaceutical products, national doctors, international doctors, a Human Resources module, an Inventory of disaster periods, an investment module and one for health programs.

229. In Nicaragua there are 166 health centers, 32 hospitals and 17 SILAIS (Ministry of Health Units who locally administer the health centers). In Managua, alone, there are 22 health centers.

230. Presently there are 23 pilot health units participating in the implementation of SIMINSA. Connection with the pilot sites is made through dial-up and the plan is that all the health centers and the SILAIS should make use of email and the Internet.

231. SIMINSA considers installing part of the financial administration in the SILAIS and the hospitals. The Ministry of Health (MINSA) will then receive the reports in the SIGFA format (initially on diskette with the same database structure or in hard copy). Currently SIMINSA is working on the automated interface with SIGFA. The software used is the same ORACLE as that used by SIGFA and SIMINSA is already connected to SIGFA.

232. Presently MINSA has a web server, a mail server and a 64 Kbps Radio-Modem connection with the Internet. The website is not yet designed but SIMINSA plans to put the statistics (e-g- the statistics that MINSA presently process for the WHO), information about health and healthy food habits, etc. on the site.

233. In MINSA there are 344 PCs at the central level, of which 50 are connected to SIMINSA. In the pilot hospitals there are approximately 134 PCs with access to SIMINSA. Among the pilot sites are: Nueva Segovia, Granada, Chontales, Masaya and Managua. In each department there are 4 pilot sites: 1 SILAIS, 1 hospital and 2 health centers. In Managua the centers are: Hospital La Mascota, Hospital Alemán and the Centro de Insumos para la Salud.

234. There are eight SIMINSA staff members: one administrator of data banks, one responsible for development, one analyst, one technical support chief, five implementers (3 from the ministry and 2 external, who train and assist end users), one network administrator and one director.

235. One obstacle to the integration of government information systems is the lack of a unique ID number for people in Nicaragua.

I.7. The TELCOR/ FITEL Rural Telecentres project

236. An Investment Fund for Development of Rural Telecommunications (FITEL) has been created within the Telecommunication Sector Reform Project, financed by the World Bank. As part of the strategy to develop rural telecommunications TELCOR is implementing pilot community information centers in rural areas, altogher.46 Telecentres, located in Post Offices, with 7-10 PCs in each telecenter. 14 of these are located in Managua (see Appendix 6).

I.8. Other projects with and ICT component

237. There are various other projects with an ICT component, such as the projects of the Instituto Nicaragüense de Estudios Territoriales (INETER) and the Instituto de Fomento Municipal (INIFOM), which use Geographical Information Systems (GIS). Three are also other telecenter projects (in total some 10 according to [1]). Some of these are for a particular sector, others are multipurpose telecenter, which are expected to contribute to reaching the goal of universal access to ICT.

J. HUMAN RECOURSES

J.1. ICT education in primary and secondary schools

238. In Nicaragua there are a total of 5,974 public and 1,614 private primary and secondary schools. 80% of the students attend public schools. There are hardly any private schools in rural areas.

239. Public primary and secondary schools usually don't have any computers for educational purposes. The MECD will change this situation but only for a tiny percentage of the public schools. To provide all public schools with access to computers for education sustainable models will need to be developed.

240. The situation in private schools is somewhat better. The result of a survey, made by phone calls to a sample of 50 private schools, of which only 50% responded, was that 80% has computer labs but only 12% has access to the Internet. In this sample the average number of student per PC was 35. [1]

241. It is important to note that all these schools were located in Department capitals and that the sample only represents some 5% of all the private schools. Generally speaking, schools located in rural areas don't have access even to telephones. Consequently one cannot infer from the survey that the majority of private schools have computer labs.

242. MECD shared the opinion of many of the interviewed persons, that there is a lack of clear policies regarding ICT in education and of standards and guidelines for equipment and software.

J.2. Technical education and training in ICT

243. The Instituto Nacional Tecnológico - INATEC, is the standard setting institution for the vocational training in the country.

244. According to INATEC, technical education and vocational training is provided in 288 training centers, of which 37 are run by the state, 4 are subsidized and 247 are private. In 2001, 94 centers had a total of 75,159 participants in their technical training programs.

245. The programs offered include basic computer operator (Windows, MS Office), and a variety of optional programming and computer courses (Visual Basic, Visual Fox Pro, Linux, computer maintenance, Internet navigation, graphic design, web design, etc.).

246. 70% of the 37 state-run schools have computer labs. The are used only for training of professionals in use of MS office tools and for training of students in technical careers related to informatics. In other technical careers information technology is not taught at all.

247. CONICYT's strategic plan includes the CETIS (Centro tecnológico de inserción social) project, which will be implemented in existing technical schools in the penitentiaries. UNICA (Universidad Católica) will back the diplomas issued so as to ensure that those deprived of liberty will leave the prisons as professionals.

248. It was not possible to obtain information about how well equipped the private technical training centers are with computer labs. However, clearly there is a large number of private centers, including some Internet cafés, which offer computer courses, but almost exclusively in MS Office applications (World, Excel, etc.).

249. La majority of the telecenter projects described in section I will also offer training of the users. However, as in the case of training centers, until now the vast majority of telecentres and Internet cafés and telecenters are found only in Managua and some of the Department capitals.

J.3. Higher education in ICT

250. There is total of four public universities, 27 private universities and two higher technical educational centers. 10 universities and higher technical centers, public and private, are accredited by the Consejo Nacional de Universidades (CNU), which is the national higher education authority. There are 23 universities and higher technical educational centers, legally established but not accredited by CNU (see www.cnu.edu.ni). In 1999, the total number of students in the four public universities was 36,339 [3].

251. All the four public universities have various computer labs, connected in LANs, except UNA, which only have two small LANs for the administrative area and for the central library. The number of PCs for education and research vary between about 100 in the UNA with 2,685 students and some 500 in the UNAN- Managua with 17,800 students. [3]

252. Currently there is a project to interconnect these four public universities through fiber optic cable. All are connected to Internet through dedicated lines and/or dial-up. The UNI has an ADSL connection with 512 Kbps up-stream. The UNA has only dial-up connections. The UNAN Managua has a 128 Kbps radio link and dial-up connections. The UNAN-León has a dedicated 128 Kbps line plus dial-up connections.

253. In the public universities it is mainly the 14% of students, in informatics-related courses, such as system engineering, computer science, etc., who have access to the computer labs.

254. The labs are used for learning programming software, such as Visual Basic, Access and Informix, and tools like Case for Analysis and Design of Systems. They are also used for teaching and research related to network operating systems and for doing practical exercises on hardware. Furthermore, some courses include theoretical studies

of servers, routers and other IP network components. Some of the students and the teachers also use email to share information electronically.

255. According to a survey, 100% of the private universities with ICT careers have computer labs and LANs. Teachers as well as students have access to Internet and teachers have their own email account and share information electronically. [1]

256. It may be concluded that sufficient technicians and engineers in the field of informatics are produced. Presently, many of the graduates do not find jobs that correspond to their education. Many of them have to be satisfied with less qualified work (selling and repairing computers and auxiliary equipment) or work as taxi drivers or in other professions, which have nothing to do with their education.

257. Nevertheless, according to some of the interviewed persons, there is a lack of high-caliber ICT professionals, with the required knowledge and experience.

258. The quality of the education is, in principle, controlled by CNU but there is still a lack of clear criteria and standards for ICT education.

259. The public universities also lack electronic libraries. Considering the limited budget for education, it is recommended that international development agencies consider supporting projects with the objective to develop such virtual libraries.

J.4. Availability of personnel for ICT services (maintenance, of ICT equipment and development of software)

260. In Managua and in most department capitals, personnel for basic maintenance of computers and auxiliary equipment are available in sufficient numbers. Not withstanding, as indicated above, there is a lack of people who have sufficient knowledge and, above all, experience in maintenance at more complex levels and of WANs, servers, routers and IP networks in general.

261. In rural areas there are very few qualified technicians, even for basic maintenance of ICT equipment.

262. As indicated above, university-level students in ICT related technical careers learn some of the principal programming languages. Nevertheless, there seems to be little indigenous software development, matched to the Nicaraguan context. Generally, software is obtained from the large North American suppliers (Microsoft, ORACLE, etc.) or from the equipment vendors.

263. All the ICT projects described in section I have a training component. Among the staff of these projects there is currently people with in-depth knowledge and hands-on experience of the equipment as well as software systems they work with.

264. The IPSs staff is generally well qualified and among those who work in telecentres and Internet cafés there are some champions in use of computers and the Internet.

265. Additionally, there are a few very high-caliber Nicaraguan ICT consultants, who work for the government and in the private sector. Some of these are also contracted by international development agencies.

K. CONTENT PROVIDERS

266. At present the Internet content of Nicaraguan origin is rather limited and of little direct use to the general population.

267. The main content providers are:

- Government entities
- Educational and training institutes
- NGOs
- Banks
- Commerce
- Newspapers and other printed media
- International development agencies and embassies in Nicaragua

(See www.ibw.com.ni)

K.1. Government entities

268. Most of the governmental entities in Managua have developed their own website. However, the content provided is usually limited to information about their organization, brief descriptions of some of their projects (objectives, achievements and sources of finance) and to official documents already published in print.

269. The site of the Central Bank and the Nicaraguan Statistics and Census Institute (INEC) publish statistics of interest to the government, researchers and international organizations but there is not much information of direct use for the population at large. The Central Bank also maintains a virtual library at its website.

270. It is important to note that many of the government registers are not yet digitalized. Many of them comprise information of interest and direct use for the general population. Their digitalization could improve the efficiency and transparency of the government and facilitate substantially the life of many people (if they had access to the Internet).

271. As indicated in section I, there are several projects, which include digitalization of registers and other information resources. CONICYT is in the process of making an inventory of digitalized information sources but this is not yet available.

272. With the objective to identify digital and non-digital information resources a questionnaire was sent to 12 organizations. Regrettably we only received response from two of those (see Appendix 3).

273. Nevertheless, through the interviews we learned that there are many other registers kept by Governmental organizations municipal authorities in digital form (text files, databases, spreadsheets, etc.) or manually.

274. For example, the Supreme Court of Justice is keeping a trade register in ORACLE, which includes the name of the business, when established, assets and financial information and the police keep the drivers' license register. Another example is the current project to digitalize the real estate owners register. Municipal authorities keep

registers on births, marriages, etc., in electronic form or manually.

275. Most of these registers and other sources of information are not accessible at a distance due to lack of ICT infrastructure. As earlier indicated lack of national standards, including a personal ID number, is also a major obstacle to exchange of digitized information.

276. We have seen that development agencies contribute to the digitalization of information resources and the development of an ICT infrastructure to facilitate the exchange, processing and public access to such resources.

277. However, there is lot more that needs to be done. Digitalization of information recourses continues to be an area where external assistance could have a very positive impact, by improving the government's the efficiency and transparency. National standards and guidelines for equipment as well as for software should be developed quickly to avoid further fragmented development.

K.2. Education and training institutes

278. There are some 10-20 educational institutes, mostly universities, which have websites with information about their institute and programs. At present there is no training material available on-line, let alone interactive distance learning courses.

279. We recommend that universities initiate development of resources for distance education and vocational training courses, including support material for literacy campaigns (and/or adaptation of existing resources to the Nicaraguan context). Such resources would contribute to improving education in public schools and extend this to population groups who presently don't benefit from any education. Moreover, providing schools with computers without making use of such resources seems wasteful. This is another area where assistance from development agencies is needed.

K.3. Non-Governmental Organizations (NGOs)

280. NGOs are making available a considerable amount of information and support material though their websites (documents, guidelines, meeting points, etc.) on subjects related to human rights, health, AIDS, democracy, promotion of women, protection of children, community development, etc. There are also NGOs that supports the agriculture sector or other economic sectors.

281. In this category one will also find some sites devoted to cultural and religious events and in the Central Bank's virtual library; for example, one can access the complete works of the national poet Ruben Darío.

K.4. Banks

282. Most of the banks have their website with information about their services. Some of them allow their clients to consult and transfer money between their own accounts, through the Internet

K.5. Commerce

283. Out of the some 8,000 private enterprises in Nicaragua, 536 have their own website with "local" or foreign content, though not all of them are active. Many of these websites are hosted and managed in other countries. Within this category there is a number of travel agencies, which have a considerable amount of information and pictures from Nicaraguan tourist sites, in addition to information about their services. This is doubtless "local" content but the target group is mainly foreigners. In addition, there are some Nicaraguan sites with entertainment (music, etc.)

284. Not surprisingly, e-commerce is very limited. Presently some 6 companies offer electronic commerce (B2B and B2C), mainly companies, which sell or offer services related to ICT or luxury shops like jewelleries.

285. Most of the current users may in fact be more interested in foreign than in local content. Many of them are the affluent members of society who make business with foreign countries and buy goods from foreign countries through the Internet.

K.6. Newspapers and other printed media

286. Some Nicaraguan daily newspapers and journals have their own websites. At least two of them provide access to a digital version of their paper to those who have access to the Internet. These sites also have classified ads (sell and buy ads, etc)

K.7. International Development Agencies and embassies located in Nicaragua

287. The content of International Development Agencies' and embassies´ sites include include information about their organization (or country in the case of embassies) and their activities in Nicaragua. Most of the sites also have links to other national and international sites, some of which there are of interest to the general population.

L. SUMMARY CONCLUSIONS

288. There is a political will to develop ICT in all sectors of the country. The political environment and the attitudes to ICT of high-level Government officials are generally favorable. One evidence of this is this significant number of ICT intitiatives described in this report.

289. The most important obstacles to rapid development of ICT in Nicaragua are:

- The economic situation of the country, characterized by a chronic Government budget deficit and a very significant proportion of the population, who lives below the poverty line and, thus, don't have the means to benefit from the use of ICT under present market conditions.
- The lack a national ICT policy and lack of coordination between the national ICT projects. This results in a fragmented development in isolated sectors,

duplication of efforts, problems of interoperability and exchange of registers and databases as well as in high maintenance and training costs.

- The insufficient capacity of international transmission links, which reduces considerably the speed of connections and, hence, the utility of the Internet. It also results in high communication costs for the ISPs and their customers.
- The lack, or insufficiency of telecommunication infrastructure at the national and local levels in many parts of the country. This means that a large proportion of the people either doesn't have access to a telephone line at all, or have only access to low-quality lines, which don't allow for Internet connection at an acceptable speed.
- The fact that most people lack the skills and knowledge required to use computers and the Internet.
- The lack of content of relevance and direct use for the population at large, which results in a low demand for ICT services.

290. All these obstacles need to be eliminated or reduced to achieve a harmonious development of ICT in the country. Should any of them be ignored, the digital divide is likely to continue to grow.

291. In the short term, the construction of the backhaul to ARCOS-1 would have a direct positive impact, reducing the cost of international links and, thus, improve the accessibility to Internet. However, investments are also ugently needed to increase the capacity and extend the national network to solve the problems of connectivity and access.

292. The private sector should build and operate the networks but the international development banks should consider helping them to find the capital needed. The Government may need to revise current telecommunication regulations to eliminate the still reaming obstacles to free and fair competition in this sector.

293. The SIGFA project has made considerable progress in improving the financial management of the Government. This contributes to improve the efficiency and transparency of the Government. The SIGFA high-capacity network could also serve as a platform for e-government services, first giving access to such services to the people in Managua (where 25% of the population lives) and, in the near future, to the population in the departmental capitals.

294. To achieve universal access (or get closer to this goal), local Internet POPs should be established in all the departments of the country. This would provide and incentive to establish telecentres in these capitals and in adjacent rural areas and, when sustainable models have been developed, in all municipalities of the country. To achieve a larger geographical coverage of telecentres in the short term, the various projects, which have funding for this should make concerted efforts to create shared multipurpose community telecentres.

295. To further stimulate the establishment of telecentres, the Government should explore possibilities to reduce the cost of communication and computers and to increase the profitability of telecentres (e.g. allow for mixed telephony and Internet services in

public telecentres in rural and isolated areas). The long-term goal should be to develop telecentre models that can be sustained in all municipalities of the country.

296. Improved access and the existence of e-government, including public services, such as education and health, which meet the needs of the nation and its people, would increase the demand for Internet services. This, in turn, would generate more content relevant to the needs of the general population. Nevertheless, in view of the high rate of functional illiteracy, it is necessary to provide access to ICT services by means of civil society organizations (NGOs) or other intermediaries. Without intermediaries the use of the e-government and other ICT services will remain the privilege of a minority of the population.

297. To realize this vision it is necessary to develop relevant content and adapt the Government's administrative routines and processes. This should improve the quality and efficiency of the public service, like education and health. Administrative transactions will be facilitated for the government as well as for private enterprise (including SMEs) and for the general population.

298. Development of content and infostructure must go hand in hand with the development of the infrastructrure. Further digitalization of government information resources and the integration of these into one comprehensive government information system is one of the challenges. Considerable progress has been made and content development continues in the various ICT projects but much remains to be done. Development and adaptation of distance learning material, including support material for literacy campaigns is another challenge, which has not yet been dealt with. All this is an area where assistance from development agencies continues to be very useful.

299. The fact that the Government has charged the CONICYT with the development of a national ICT policy is a good sign. However, the slow progress, so far, indicates that development agencies' support to accelerate this process would be very useful, if not necessary. More efforts to improve coordination between ICT projects, both at national level and among the international development agencies involved are required.

300. The existence of a national ICT policy is a condition for the harmonious development of ICT in Nicaragua. To support the development of a national ICT policy should therefore be the first priority.

Bibliography

[1] Draft e-Readiness report (www.eready.org.ni)
[2] Demand study (Estudio de demanda de) TELCOR – January 2001
[3] Quick Scan Survey, Sida TuDelft, February 2000
[4] Pilot survey of Mozambican digital information resources, Stadskontoret, May 2002 (Sida study).

APPENDIX 1- TERMS OF REFERENCE

Consultancy Services for Country ICT Survey for Nicaragua

1. BACKGROUND

Sida supports the rapid integration of ICT in developing countries in order to improve communications and the exchange of information. Sida's policy is outlined in the document "Strategy for IT in Development Cooperation" (see www.sida.se)

During 2001 and 2002 Sida has commissioned a number of Country ICT Surveys for countries where Sida either supports the development of ICT or where discussions have started on possible support. Such surveys have been made for Rwanda, Tanzania, Mozambique and Sri Lanka.
The Country ICT Surveys include information regarding key ratio, connectivity, access, the human resource situation, key institutions, policy and regulatory framework. Such information is of great value to provide all stakeholders in the developing countries with comprehensive information of the ICT situation for the planning of future ICT related projects.

No comprehensive Country ICT Survey has been made for Nicaragua. During the first half of 2002 Cámara de Indústrias de Nicaragua (CADIN) will perform a limited eReadiness Assessment as part of its project to formulate a business plan for a National Development Gateway.

2. OBJECTIVES

- To provide stakeholders in Nicaragua, as well as the Swedish Embassy in Managua and units of Sida, with information and assessment of the ICT situation in Nicaragua as a basis for the ICT policy processes and the planning of ICT related development activities and foreign assistance to such activities.

3. SCOPE OF THE SERVICES

The Consultant shall make a Country ICT Survey for Nicaragua. The survey shall include:

- a description of the ICT situation, and
- a basic analysis of factors of major interest for the promotion of use of ICT for development purposes.

The *descriptive* part shall cover items and questions set out in Appendix 1 "Questions and areas to be covered". The description shall include information on forecasted changes and developments in the near, where applicable. Key data shall be gathered as completely as may be reasonable in terms of cost and time and be summarized in an Appendix (see Key Ratio in Appendix 1).

The *analytical* part shall be seen as a first step to identify major areas of interest for a dialogue beteen Sida and the country concerned on possible support to ICT development. It should address the following questions:

- Which major trends and possible initiatives can be observed in the country regarding the use of ICT?
- Which are the main obstacles for increased use of ICT?
- Which are the main opportunities to increase the speed of ICT integration?
- Which type of interventions would be most strategic for development cooperation?

5. METHODOLOGY

5.1 METHODOLOGY

The Survey shall be made in close cooperation with stakeholders in the country where the study will take place. Local contractors should preferably be subcontracted.

Data gathering for the survey is supposed to be done from sources availableinternationally and from a field visits. Such a field visit is estimated to be 2-3 calender weeks.

6. REPORTING

6.1 WRITTEN REPORTS

The following reports will be produced in Spanish by the consultants, and be delivered to Sida in electronic format

Draft Country ICT Survey
Country ICT Survey and Summary

The Country ICT Survey is expected to be approximately 40 pages, a summary approximately 4 pages.

Name of key persons and other relevant institutional data (size, ownership etc. must be listed in the reports).

Sources must be given for key ratio.

APPENDIX 1
Questions and areas to be covered

POLICY ENVIRONMENT

- **IT awareness**

Where in the process of formulating a national ICT policy or the equivalent does the country stand? What steps have been taken, when?

- **Computer literacy**

What level of computer literacy/ awareness exists in the key segments of society (central government administration, financial sector, private business, universities)?

- **Regulatory environment**

What kind of political and regulatory framework exists concerning the regulation of telecommunication operators, Internet Service Providers, data communication to and from the country…?

What changes could be expected in the near future concerning regulatory matters as a result of decisions, plans and discussions?

CONNECTIVITY/ACCESS

- **Presence of national Internet exchange**
  Is there an Internet exchange present in the country or is the Internet traffic channelled through the USA or Europe?

- **The Internet market from an Internet user perspective**
  Number of Internet Service Providers? Key data on major ISPs. What kind of services do they offer? What is the price for the services offered? In what parts of the country are services of different qualities and prices offered?

- **The fixed line telecommunication from a user perspective**
  Number of operators? Key data on operators. What kind of services do they offer that is relevant for data communication (dial-up connections, ISDN, DSL...? What is the price for these services? In what parts of the country are services of different qualities and prices offered?

- **The mobile telecommunication market from a user perspective**

Number of operators? Key data on operators. What kind of services do they offer? What is the price for these services? In what parts of the country are services of different qualities and prices offered?

- **The market for data communication media other than telecommunication networks from a user perspective**

  Do other alternatives for connections to national or international ISPs exist (satellite, Bush radio, cables etc)? What are the costs? What kind of permissions is needed (if needed) for direct external communications?

- **Access to IT services (maintenance, software development)**

- **Access to electricity in the countryside**

  Identify the geographical areas covered by fixed electricity networks. Information on the forecasted expansion rate for the next few years.

HUMAN RESOURCES

- **Higher ICT education**

Number of universities and higher education institutions with education programmes in ICT. Key data on institutions and the education programmes (focus, quantity, quality, and facilities)

- **Training of ICT technicians**

Number of institutions for the training of ICT technicians? Key data on institutions and the training programmes (focus, scope, quantity, quality, and facilities)

- **ICT education at primary and secondary school level**

Information on ICT education in primary and secondary schools

INSTITUTIONS

- Identify the commercial stakeholders in the different markets (fixed line telecommunication, mobile telecommunication, data traffic, other data communication media, ISP/retail, ISP/major customers).

- Presence of major domestic and multinational companies delivering ICT services, ICT hardware and ICT software.

- Identify the public stakeholders and their roles (ministerial level, government administration for telecommunication regulations, telecommunication operators, universities and other higher education institutions with ICT education etc)? Description of the stakeholders (size, experience capacity)

- Identify other stakeholders as a local chapter of the Internet Society or other similar organisations, professional organisations and individual champions.

LOCAL CONTENT DEVELOPMENT

Software and content development produced locally
Quantity and quality of local websites and other related IT services (government information, libraries, e-commerce, portals and gateways)

KEY RATIO
Key data to be gathered:

Operators
Number of fixed lines telecom operators
Number of mobile line telecom operators
Number of Internet Service Providers (ISPs)
Possible alternative suppliers of bandwidth
Number of Internet Point of Presence (total amount, in how many cities)
International bandwidth
Number of cities with local modem pools for dial-up

Users
Number of fixed lines
Number of fixed lines per 1000 inhabitants
Expansion rate: number of new lines a year (present situation, plan for next coming years)
Percentage of digital switchboards

Number of mobile phone subscribers (divided on operators)
Geographical coverage of mobile networks
Number of mobile telephone subscriptions per 1000 inhabitants
Expansion rate: number of new subscriptions a year (present situation, forecasts)

Number of Internet subscriptions
Number of Internet subscriptions in the capital (and other major cities)
Number of Internet subscriptions per 1000 inhabitants
Number of new Internet subscriptions last year

Number of Internet hosts
Number of Internet hosts per 1000 inhabitants

Number of new Internet hosts last year

Number of Internet cafés and Multipurpose Community Centres respectively

Price
Telephone call cost, fixed line $/minute (day/night, local/regional)
Telephone call cost, mobile
Cost ISDN
Cost DSL

Standard cost Internet subscription
Standard cost Internet usage at an Internet café

Plan documents
National ICT plan (name, date)
National telephone expansion plan (name, date)
National electricity expansion plan (name, date)

Appendix 2 – Organizations and people interviewed

ENITEL (Empresa Nicaragüense de Telecomunicaciones)	3 de junio de 2002
Nills Jensen	Consultor Internacional
Rene Lorente	Coordinador Grandes clientes, Sector público y PYMEs
Juan Carrillo	Planeación de Red
Sitio Web	www.enitel.gob.ni
CONICYT (Comisión Nacional de Ciencia y Tecnología)	4 de junio de 2002
XX	3 – 11 de junio 2002
Cornelio Hopmann	
Sitio web	www.eready.org.ni
Raúl Chang	Secretario Ejecutivo
José Luis Norori	Abogado y Notario Público
Sitio Web	www.conicyt.gob.ni
IDEAY (PSI)	4 de junio de 2002
Fernando Solís	Gerente General
Sitio Web	www.ideay.net.ni
UCRESEP (Unidad de Coordinación del Programa de Reforma y Modernización del Sector Público	5 de junio de 2002
Roberto Abarca	Director Financiero-Administrativo
María José Jarquín	Directora
Sitio Web	www.ucresep.gob.ni
SIMINSA (Sistema de Información del Ministerio de Salud)	5 de junio de 2002
Karen Ramírez	Directora del SIMINSA
Alfonso Jiménez	Administrador de Base de Datos
Sitio Web	
UNI (Universidad Nacional de Ingeniería)	6 de junio de 2002
Leonel Plazaola	Director de Proyectos de Investigación
Sitio Web	www.uni.edu.ni
SIA-MAGFOR (Sistema de Información Agrícola del Ministerio Agropecuario Forestal)	6 de junio de 2002
Juan Ramón Rosales	Director de SIA-MAGFOR
Sitio Web	www.sia.net.ni
SIGFA (Sistema Integrado de Gestión Financiera Administrativa)	7 de junio de 2002

Kitty Monterrey	Director Ejecutivo
Luis Montealegre	Director de Soporte Técnico y Comunicaciones
Sitio Web	
TELCOR (Instituto de Telecomunicaciones y Correos	7 de junio de 2002
Mario González	Director General
Victor García	Director de Telecomunicaciones
Pablo de la Roca	Especialista en Telecomunicaciones
Sitio Web	www.telcor.gob.ni
INTUR (Instituto Nicaragüense de Turismo)	7 de junio de 2002
Julio Calero	Colaborador de Informática
Sitio Web	www.intur.gob.ni
José María Tercero Silva	Consultor TIC
Internet café en Granada	9 de junio 2002
	Director
PROCOMPE (Proyecto de Competitividad)	10 de junio de 2002
Luis López Okrassa	Oficial de Servicio de Desarrollo Empresarial
Sitio Web	
CONICYT (Comité Nacional de Ciencia y Tecnología)	10 de junio de 2002
Fermín Pineda	Coordinación Cooperación Externa
Abel Reyes	Coordinador de Investigación, desarrollo e innovación
Sitio Web	www.conicyt.gob.ni
IBW (PSI)	10 de junio de 2002
John Wyss	Gerente General
Sitio Web	www.ibw.com.ni
ESTESA (Operador de TV por cable)	10 de junio de 2002
Augusto Cesar Vargas	Gerente de Operaciones
Sitio Web	www.estesa.com.ni
CNE (Comisión Nacional de Energía)	11 de junio de 2002
Elías Juárez	Asistente Coordinador de la CNE
Sitio Web	
ALFANUMERIC (PSI)	11 de junio de 2002
Jaime Argeñal	Gerente General
Sitio Web	www.alfanumeric.com.ni
COMPES (Consejo Nacional de Planificación Economica-Social)	11 de junio de 2002
Mayra Calero	
Sitio Web	www.conpes.org.ni
UNIFOM (Instituto Nicaragüense de Fomento Municipal)	11 de junio de 2002
Pedro Abarca	Director de la División de Evaluación y

	Política
Carlos Duarte	Presidente de INIFOM

PNUD (Programa de desarrollo de las Naciones Unidas	
Sitio web	
FAO	
Loy Van Croyder	
Sitio web	
MEDC (Ministerio de Educación, Cultura y Deporte)	11 de junio de 2002
Róger Hernández	Director de Informática
Sitio Web	www.mecd.gob.ni
INETER (Instituto Nicaragüense de Estudios Territoriales)	12 de junio de 2002
Javier García	Asesor Técnico
Sitio Web	www.ineter.gob.ni
INEC (Instituto Nicaragüense de Estadísticas y Censos)	12 de junio de 2002
Luis Ramírez	Director de Informática
Sitio Web	www.inec.gob.ni

Appendix 3 – surmvey of information resoureces.

El cuestionario presentado en Anexo (adaptado de [4]) para coleccionar información sobre recursos de información digitalizada y no digitalizada fue enviada a las siguientes organizaciones:

Instituto Nacional de Estadísticas y Censos (INEC)

Instituto Nicaragüense de Estudios Territoriales (INETER)

Centro de Exportaciones e Inversiones (CEI)

Ministerio de Salud (MINSA)

OPS/ OMS

Coordinadora Civil de Emergencia y Reconstrucción (CCER)

Ministerio de Fomento, Industria y Comercio (MIFIC)

Sistema de Información Ambiental del Ministerio del Ambiente y de los Recursos

Naturales (SINIA-MARENA)

Sistema de Información Agrícola del Ministerio Agropecuario Forestal (SIA-MAGFOR)

Sistema Nacional de Inversión Pública (SNIP)

Universidad Centroamericana (UCA)

Instituto Nicaragüense de Fomento Municipal (INIFOM)

Lamentablemente sólo dos de las organizaciones respondieron – el Ministerio de Fomento, Industria y Comercio (MIFIC) y el Instituto Nacional de Estadísticas y Censos (INEC).

Las respuestas fueron bastante incompletas – extractos de las respuestas se presentan en la tabla siguiente.

Extracto de las respuestas de dos instituciones a la encuesta sobre recursos de información digitalizada

Institución	Recurso	Descripción del recurso	Plata-forma	Dueño del recurso	Financia-miento del recurso	Breve descripción de quien y cómo se colecciona y entra la información
Ministerio de Fomento, Industria y Comercio	SAAT	Control de exoneraciones del programa de promoción de las exportaciones	Win NT, SQL Server y Visual Basic	Secretaria Técnica Comisión Nacional de Promoción a la Exportación	Proyecto BID/MIFIC 789	Se solicita las empresas a través de formatos de adscripción al régimen de admisión temporal y el informe semestral de las empresas bajo el mismo régimen
Ministerio de Fomento, Industria y Comercio	Registro de Inver-sionistas	Registra los inversionistas extranjeros				
INSTITUTO NACIONAL DE ESTADÍSTICAS Y CENSOS (INEC)	Crea-ción de la Base Carto-gráfica 1:50,000	Esta base cartográfica contien información Vectorizada en diferentes capas todos los elementos cartograficos a nivel de municipio (Ríos, caminos, comarcas, comunidades, segmentos, ect)	MicroStali on y Arview 3.1 – Window NT WordStati on	INEC	FONDO DE POBLACIÓN – UNION EUROPEA - CIAT	Se toma como base oficial la cartografía a 1: 50,000 que dispone INETER, sobre esta base se realizan las actualización uqe los cartógrafos de campo levantan. La entrada de los datos se realizan a través de Scanner y se digitalizan en pantalla con el Software IrasB de BENTLY
INSTITUTO NACIONAL DE ESTADÍSTICAS Y CENSOS (INEC)	Elaborac ión de albúnes de mapas de segment os	Se estan elaborando albunes de mapas de segmentos a un solo formato para Scanearlos y así resguardarlos a formatos digital	MicroStali on y Arview 3.1 – Window NT WordStati on	INEC	FONDO DE POBLACIÓN – UNION EUROPEA - CIAT	Se toma como base oficial la cartográfia a 1: 50,000 que dispone INETER, sobre esta base se realizan las actualización uqe los cartógrafos de campo levantan. La entrada de los datos se realizan atravez de Scanner y se digitalizan en pantall con el Software IrasB de BENTLY

Apendice 4 – Disponibilidad de sistemas administrativas, equipo de computo y de comunicacion en 151 municipios (Fuente INIFOM)

No.	Departamento	Municipio	Población Total (2000)	Población Urbana	Dist. Managua Horas	Dist. Cab. Deptal. Horas	Sistema. Informac.	Sist. De Cobro	Control Fiscal	Total Sist. Aplic.	Sist. Catastro uso	Unid Técnica	Total Pers. Calif.	Equipo de Computo.	Tiene energ elect.	Tiene Telef.	Tiene Radio
1	Nueva Segovia	Ciudad Antigua	4056	1325	4.0	0.8	0	1	3	4	1	0	0	0	310	1	1
2	Nueva Segovia	El Jícaro	26366	4746	5.5	2.0	3	3	3	7	1	1	1	5	893	250	2
3	Nueva Segovia	Murra	12346	543	6.0	2.5	0	1	3	6	1	1	0	1	197	3	1
4	Nueva Segovia	Jalapa	41756	21668	6.0	2.5	1	2	3	6	1	1	1	4	3641	250	2
5	Nueva Segovia	Macuelizo	5237	360	4.5	1.0	0	1	3	4	1	1	1	0	120	4	1
6	Nueva Segovia	Santa María	4200	523	5.5	2.0	0	2	3	7	1	1	0	1	158	0	2
7	Nueva Segovia	Quilalí	24589	9330	6.0	3.0	1	1	3	6	1	1	0	2			
8	Nueva Segovia	San Fernando	7062	2180	4.0	0.8	0	2	1	4	1	1	1	2	240	14	
9	Nueva Segovia	Mozonte	6712	2416	3.7	0.2	0	2	0	4	1	1	0	0	256	6	
10	Nueva Segovia	Dipilto	4457	655	4.0	0.5	1	2	1	4	1	1	0	3	141	12	1
11	Nueva Segovia	Ocotal	30914	29951	3.5	0.0	2	4	3	9	1	1	4	4			
12	Nueva Segovia	Wiwilí NS	7434	3389	7.0	4.0	0	1	2	3	0	0	0	0			
13	Madriz	San Lucas	12405	694	4.0	0.5	1	2	0	3	0	1	1	2			
14	Madriz	San José de Cus	5866	1290	6.0	1.5	0	1	3	5	1	1	0	0	200	nd	
15	Madriz	Las Sabanas	4817	990	4.5	1.0	1	1	2	4	1	1	0	0			
16	Madriz	Totogalpa	9892	1682	3.0	1.0	0	1	2	4	0	1	0	2	300	14	1
17	Madriz	Somoto	34168	16856	3.5	0.0	0	3	3	7	1	1	5	2			

18	Madriz	Yalagüina	8742	1391	3.2	0.5	2	2	3	7	1	1	0	4	680	12	
19	Madriz	Palacagüina	14040	4452	3.2	0.5	0	1	2	4	1	1	0	2			
20	Madriz	San Juan de Río	18092	2198	5.0	2.5	2	2	0	4	1	1	2	4			
21	Madriz	Telpaneca	16172	2879	4.0	1.5	0	1	3	4	1	1	0	2	226	9	
22	Estelí	Condega	29247	8914	3.0	0.5	2	3	3	8	1	1	2	10	1577	200	
23	Estelí	Pueblo Nuevo	18602	2911	3.7	1.2	1	2	3	6	1	1	3	3	1353	152	2
24	Estelí	Estelí	107458	84811	2.5	0.0	4	2	2	6	1	1	5	9	15156	46002u	
25	Estelí	La Trinidad	23882	10100	2.0	0.5	1	3	2	5	1	1	0	0	1200	336	
26	Estelí	San Juan de Limay	17434	6922	3.5	1.0	1	0	3	3	0	1	1	4	646	80	4
27	Estelí	San Nicolás de Or	7350	565	2.5	0.5	1	2	2	6	0	1	0	0			
28	Chinandega	San Francisco del	10503	3080	5.5	3.5	1	1	3	6	1	1	1	2	15%	26	
29	Chinandega	San Pedro del Nor	4799	485	5.0	3.0	2	1	4	6	1	1	1	2			
30	Chinandega	San Juan de Cinc	7672	1636	4.5	2.5	2	2	0	4	1	1	1	2	315	2	
31	Chinandega	Santo Tomás del	7347	437 nd	4.0	2.0	1	2	1	3	1	1	1	2	90	2 pub	
32	Chinandega	Somotillo	29362	11726	3.5	1.5	2	3	1	4	1	1	1	4			
33	Chinandega	Villa Nueva	27522	6522	3.5	1.5	2	2	3	5	1	1	1	2	1287	180	
34	Chinandega	El Viejo	83856	33607	2.5	0.5	3	3	3	7	1	1	1	2	Si 39%	301	1
35	Chinandega	Puerto Morazán	13418	5178 nd	3.5	1.5	1	3	1	4	1	1	1	3	550	2	
36	Chinandega	Corinto	17499	17499	2.5	0.5	3	0	0	0	0	1	0	0	2860	945	
37	Chinandega	El Realejo	10300	4271	2.3	0.3	3	3	2	5	1	1	0	2	898	12	
38	Chinandega	Chinandega	118078	84281	2.0	0.0	3	2	3	6	1	1	7	5	13000	1802	
39	Chinandega	Chichigalpa	49677	34171	2.0	0.5	2	3	2	6	1	1	4	2			
40	Chinandega	Posoltega	13331	4189	2.0	0.3	4	3	0	4	1	1	0	4	25%	0	
41	León	León	184041	143878	1.5	0.0	0	3	3	8	1	1	11	11	57%	86%	1
42	León	Nagarote	34618	23291	0.7	0.3	3	3	0	4	1	1	1	2			
43	León	Telica	27005	7375	1.7	0.2	0	3	2	7	1	0	2	5			
44	León	Quezalguaque	9193	1163	2.0	0.5	3	3	1	6	1	1	1	2			
45	León	Larreynaga	35327	6491	2.5	1.0	1	3	3	7	1	1	2	6			
46	León	El Sauce	30792	8360	3.5	2.0	2	2	2	4	1	1	2	4			
47	León	Achuapa	15632	2780	4.0	2.5	1	1	2	5	1	1	0	5			
48	León	El Jicaral	10036	1352	3.0	1.5	0	2	3	6	1	1	1	0	267	2	
49	León	Santa Rosa del P	10272	1870	3.5	2.0	2	2	2	5	1	1	1	9	221	si 2	
50	León	La Paz Centro	36410	20390	1.0	0.5	0	3	2	5	1	1	1	2	2,635	416	

51	Managua	San Rafael del Su	41574	21944	1.0	1.0	0	3	3	7	1	1	1	2	4,200	97	
52	Managua	Villa Carlos Fonse	32818	3941	0.8	0.8	0	3	3	6	1	1	0	0	1,742	4	
53	Managua	Tipitapa	98172	80527	0.5	0.5	0	3	3	8	1	1	2	2			
54	Managua	Mateare	24680	13535 nd	0.5	0.5	0	3	3	6	0	0	0	0	90%	180	
55	Managua	Ticuantepe	24377	9453	0.3	0.3	0	1	1	3	1	1	1	0	2,898	si-nd	
56	Managua	Managua	958348	876444	0.0	0.0	4	2	3	8	1	1	9	95			
57	Managua	Ciudad Sandino	131316	127167	0.3	0.3	0	2	2	4	0	1	2	0	90%	si?	
58	Managua	El Crucero	11693	4724	0.5	0.5	1	0	0	0	0	1	2	0			
59	Managua	San Francisco Lib	10405	1753	2.0	2.0	3	2	2	4	1	1	0	0			
60	Carazo	Jinotepe	44422	29795	1.0	0.0	0	3	3	7	1	1	2	2			
61	Carazo	Diriamba	57512	33564	0.7	0.3	1	2	4	7	1	0	1	0	6,755	1,308	
62	Carazo	San Marcos	30671	19017	0.7	0.3	0	4	2	7	1	0	0	0			
63	Carazo	Santa Teresa	18900	5610	1.3	0.3	0	1	1	2	1	1	1	0	si-nd	222	
64	Carazo	El Rosario	4494	2517	1.2	0.2	2	3	4	8	1	0	0	0	95%	si-nd	
65	Carazo	La Conquista	4061	823	1.7	0.7	0	1	4	5	1	0	0	0	si-nd	12	
66	Carazo	La Paz	4806 nd	2050 nd	1.3	0.3	0	2	3	5	1	0	1	0	nd	nd	
67	Carazo	Dolores	6781	6360	0.8	0.2	0	2	3	5	1	0	1	0	850	213	
68	Masaya	Catarina	8299	4040	1.0	0.3	0	2	3	5	1	0	0	0	nd	nd	
69	Masaya	Niquinohomo	15916	6204 nd	1.1	0.4	0	2	1	3	1	0	0	0	1,623	222	
70	Masaya	San Juan de Orie	3676	1619	1.0	0.3	0	1	2	4	1	0	0	0			
71	Masaya	Nandasmo	9227	5678	1.2	0.5	0	2	1	3	1	0	0	0	1,018	25	
72	Masaya	Masatepe	28778	16431	1.0	0.5	1	1	3	6	1	1	1	0	3,784	524	
73	Masaya	La Concepción	32872	10653	0.5	0.5	1	3	2	6	1	0	1	2			
74	Masaya	Masaya	139328	105478	0.7	0.0	2	2	3	7	1	1	3	2			
75	Masaya	Tisma	12697	4244	1.2	0.5	1	2	0	2	1	1	0	2	nd	nd	
76	Masaya	Nindirí	34411	8966	0.5	0.2	0	3	3	8	1	1	3	0			
77	Granada	Granada	108932	83060	1.0	0.0	0	3	3	7	1	1	5	6	15,398	si-nd	
78	Granada	Nandaime	38542	17302	1.3	0.5	0	3	3	8	1	1	1	2			
79	Granada	Diriá	7202 nd	3848 nd	1.1	0.2	0	1	0	1	0	0	0	0	si-nd	190	
80	Granada	Diriomo	23180	8515	1.1	0.2	0	2	1	3	0	0	0	2	2,000	363	
81	Rivas	Cárdenas	5346	1273	2.7	1.0	1	2	2	4	0	1	0	0	nd	123	
82	Rivas	San Juan del Sur	13125	5438	2.2	0.5	1	2	1	4	1	0	0	0	1,500	302	
83	Rivas	Rivas	41703	25837	1.7	0.0	0	3	1	4	0	1	1	0	si-nd	si-nd	
84	Rivas	Altagracia	20574	2311	4.5	2.5	0	1	2	3	0	0	0	2	1,200	50	
85	Rivas	Moyogalpa	10383 nd	3825 nd	3.5	1.5	0	2	2	4	0	0	0	2	2,085	160	

86	Rivas	San Jorge	8031	7156	2.0	0.3	0	2	2	4	1	0	0	0	1,132	245	
87	Rivas	Buenos Aires	5732	1630	2.0	0.3	0	2	1	4	0	1	1	0			
88	Rivas	Tola	24265	2237	2.0	0.3	0	2	2	4	1	1	0	1	si-nd	si-nd	
89	Rivas	Potosí	12232	4293	1.7	0.2	2	3	1	4	1	1	1	0	434	21	
90	Rivas	Belén	17643	4938	1.5	0.2	0	2	0	2	0	0	0	2	1,417	42	
91	Chontales	Juigalpa	53890	39770	2.0	0.0	3	2	3	7	1	1	2	2	6,687	2,223	
92	Chontales	Santo Tomás	18548	11788	3.0	1.0	0	2	0	4	1	1	3	6	2,030	648	
93	Chontales	Villa Sandino	23114	7627	3.5	1.5	0	2	3	6	1	1	0	0	1,459	200	
94	Chontales	La Libertad	10870	4511	3.5	1.5	0	1	3	6	1	1	0	0	500	25	
95	Chontales	Santo Domingo	13596	5203	4.0	2.0	0	2	2	7	1	0	0	2	786	3mgto	
96	Chontales	San Pedro de Lóv.	7125	2824	3.3	1.3	0	2	2	5	1	1	0	0	1,002	30	
97	Chontales	San Francisco de	3814	985	2.5	0.5	0	2	2	5	0	1	1	2	1349,y,22		
98	Chontales	Comalapa	12502	1463	2.5	1.0	0	1	0	1	0	0	0	0	206	88	
99	Chontales	Acoyapa	19820	7575	3.0	1.0	0	2	3	6	1	1	0	0	1,440	364	
100	Chontales	El Coral	8452	4182	6.0	4.0	0	2	0	2	0	1	0	2	780	5	
101	Boaco	Boaco	52395	23164	1.5	0.0	1	2	2	5	1	1	2	1	3,666	1,326	
102	Boaco	Santa Lucía	8779	1654	1.5	0.3	0	2	3	6	0	0	0	0	507	27	
103	Boaco	Teustepe	23170	3851	1.0	0.5	0	3	3	6	0	1	1	0	1,151	34	
104	Boaco	San José de los R	18200	2072	1.5	1.0	0	2	1	3	0	0	0	0	308	38	
105	Boaco	Camoapa	36577	14737	2.2	0.7	0	2	2	5	1	1	0	2	80%	800	
106	Boaco	San Lorenzo	26096	7423	1.8	0.5	0	1	0	1	0	0	0	0	Nd	32	
107	Matagalpa	Matagalpa	123747	70417	2.0	0.0	1	2	1	6	1	1	4	4			
108	Matagalpa	San Isidro	16094	6518	1.8	1.0	1	3	3	7	1	1	0	0	1,202	252	
109	Matagalpa	Esquipulas	16684	6003	2.0	2.0	2	2	3	5	0	1	1	2	1,148	7	
110	Matagalpa	Muy Muy	15494	3333	2.5	2.0	2	2	3	5	0	0	0	0			
111	Matagalpa	Río Blanco	31065	10957	3.5	4.0	0	2	1	3	0	1	4	6			
112	Matagalpa	Matiguás	45743	8695	2.0	1.5	0	3	2	5	0	0	2	4			

113	Matagalpa	San Dionisio	18972	2626	4.5	1.5	1	2	3	5	0	0	1	2				
114	Matagalpa	Sébaco	29562	19089	1.7	0.5	2	3	3	9	0	0	0	0				
115	Matagalpa	Ciudad Darío	39288	15349	1.5	0.8	0	3	3	7	1	1	3	5	si-nd	279		
116	Matagalpa	Terrabona	11100	1706	2.0	1.0	1	1	3	4	0	0	0	0	540	2mgto		
117	Matagalpa	San Ramón	26694	2298	2.5	0.5	1	2	3	5	1	1	0	0	711	70		
118	Matagalpa	Rancho Grande	17077	1195	4.5	2.5	0	3	0	3	0	1	0	0	297	NO	5	
119	Matagalpa	El Tuma-La Dalia	52030	3410	3.0	1.0	0	2	3	7	1	1	4	6				
120	Jinotega	Wiwilí (Jinotega)	49886	3542	7.0	4.0	0	1	2	3	0	1	1	0	nd	nd		
121	Jinotega	Santa María del P	37847	6120	5.5	2.5	0	3	3	6	0	1	0	0	911	6		
122	Jinotega	El Cua-Bocay	76625	4045	5.5	2.5	0	2	2	4	0	1	2	2	360	2	2	
123	Jinotega	San Sebastián de	nd	nd	4.5	1.5	0	2	1	3	1	1	0	0	nd	111		
124	Jinotega	La Concordia	7832	1669 nd	4.0	0.5	0	2	0	2	0	0	0	0	305	14		
125	Jinotega	San Rafael del No	16320	3917	3.5	0.5	0	3	3	6	0	0	1	0	750	113		
126	Jinotega	Jinotega	77222	36543 nd	3.0	0.0	0	2	1	4	1	1	3	2	7,500	2,054		
127	Atlántico Norte	Waslala	43101	5752	6.0	4.0	0	1	2	3	1	0	0	2	1,700	6	1	
128	Atlántico Norte	Puerto Cabezas	47150	26779	13.0	0.0	1	2	1	3	1	1	3	2				
129	Atlántico Norte	Waspan	37562	1878	15.0	2.0	0	3	0	3	0	0	0	0	543	6	1	
130	Atlántico Norte	Siuna	73730	12721	8.0	5.0	4	1	1	2	0	1	0	4	1,300	148	4	
131	Atlántico Norte	Rosita	17308	7030	10.0	3.0	0	2	1	3	0	1	1	2				
132	Atlántico Norte	Bonanza	14001	5286	11.0	4.0	3	2	1	3	0	1	1	6				
133	Atlántico Norte	Prinzapolka	6189	490	11.0	6.0	0	0	0	0	0	0	0	0	17%	NO	2	

134	Atlántico Sur	Bocana de Paiwas	46083	3967 nd	5.0	22.0	0	0	0	0	0	1	0	2	353	NO	1
135	Atlántico Sur	Nueva Guinea	95149	15269	8.0	7.0	1	4	2	8	1	1	0	4	3,696	200	3
136	Atlántico Sur	El Rama	59089	20318	8.0	4.0	0	3	0	4	1	1	1	4			
137	Atlántico Sur	Muelle de los Bue	27566	3081	7.0	5.0	0	3	0	4	1	1	0	5	si-nd	si-nd	
138	Atlántico Sur	El Ayote	15196	4077	8.0	12.0	0	2	2	5	1	1	0	0	NO	NO	1
139	Atlántico Sur	Desembocadura d	3736	2225	20.0	8.0	0	3	0	3	0	0	0	0			
140	Atlántico Sur	La Cruz de Río Gr	16173	1187	28.0	16.0	0	2	2	6	0	0	0	0			
141	Atlántico Sur	Laguna de Perlas	7413	3942	16.0	4.0	0	2	0	2	1	0	0	0			
142	Atlántico Sur	El Tortuguero	11146	989	26.0	14.0	0	1	0	1	0	0	0	0	110,1	NO	1
143	Atlántico Sur	Kukra Hill	8838	3366	14.0	1.5	0	2	2	4	0	0	0	0			
144	Atlántico Sur	Corn Island	6326	6326	20.0	8.0	0	5	3	8	1	1	1	2			
145	Atlántico Sur	Bluefields	43909	42084	12.0	0.0	0	2	3	6	1	1	1	2	nd	2,100	6
146	Río San Juan	El Almendro	12620	3026	6.0	2.0	3	2	1	3	1	1	0	2	90%	6	
147	Río San Juan	San Carlos	28600	6746	7.0	0.0	2	3	2	6	1	1	2	2	1,243	177	
148	Río San Juan	San Juan del Norte	321	0	17.0	10.0	0	2	0	2	1	1	1	4			
149	Río San Juan	El Castillo	11520	373	12.0	5.0	0	3	2	6	1	1	1	8			
150	Río San Juan	San Miguelito	13538	3904	6.0	1.5	2	1	0	1	1	0	0	4	si-nd	11	
151	Río San Juan	Morrito	5648	2757	5.0	3.0	2	2	3	5	1	1	1	3	si-nd	1pub	1

Appendix 6 – Internet Access Centres in Nicaragua (March 2002- Source: TELCOR)

	Departamento	Municipio	Nombre del telecentro	Ubicación	No. de máq	US$/hora	US$/hora Solo PC	Usuarios por día	Tiempo prom de uso (horas)	Proveedor de Internet	Velocidad de conexión	scan	Quemado de CD	fotocopia B/N	fotocopia color	Impre. Color	Impres. B/N	Levantado Texto	Observaciones
	Managua																		
1	Managua	Managua	Cyber-Club	Fte. UNI	15	1.79		n.d.	n.d.	Cable net	64 Kbps.	0.71	2.14	0.2	0.71				
2	Managua	Managua	Centro de copias Super Foto	Fte. UNI	10	1.43		n.d.	n.d.	Cable net	64 Kbps.								
3	Managua	Managua	Super Cyber Café	Fte. UCA	44	1.43		50	1hr	Cable net	128 Kbps.								
4	Managua	Managua	i-Mac Center	Hispamer central 1/2 abajo 1/2 sur	10	1.43		50	1hr	Cable net	64 Kbps.	0.71	3.57			0.43	0.21		
5	Managua	Managua	Central del Software	Hispamer central 1/2 abajo 1/2 sur	20	1.79		n.d.	n.d.	Cable net	64 Kbps.								
			Precio promedio sector alrededores de la UCA			1.57													
6	Managua	Managua	Cybermanía	Fte. UNAN Managua, Col. Miguel Bonilla	6	1.79		15	30 minutos	Cable net	256 Kbps.	0.5	5.71	0.04		0.36	0.21		
			Precio promedio sector alrededores de la UNAN			1.79													
7	Managua	Managua	Mundo Digital	BDF 1 c. Lago, Altamira	24	1.64		25	1hr	Cable net	64 Kbps.								
8	Managua	Managua	Cybercafé Negocios Múltiples	semáforos lozelsa 20 mts. Norte, Altamira	15	1.07		70	n.d.	Newcom	128 Kbps.	0.57				1.07	0.43		
9	Managua	Managua	Cyber café (Hipa-Hipa)	Vicky 1c. Abajo, 2c. Sur, Altamira	10	1.43		30	1hr.	Cable net	64 Kbps.	0.71					0.21		

10	Managua	Managua	Cyber café	Av. Principal Altamira, contiguo a Sydicom	10	1.43		35	1hr.	Datatex	64 Kbps.								
11	Managua	Managua	Mi Oficina	Vicky 1c. lago, Altamira	6	1.43		15	1hr.	IBW	128kbps								
12	Managua	Managua	Café Virtual	Contiguo al Quetzal, Col. Centro América	12	1.43				Cablenet	512 Kbps.								
13	Managua	Managua	Kafé´@Internet 1	Frente al Friday´s, carret. Masaya	7	2.79				New Com	128 Kbps.								
			Precio promedio sector alrededores de Altamira			1.60													
14	Managua	Managua	El Internet (existen 13 locales más en supermercados y piza hut)	centro comercial linda vista	6	3.21					512 kps.								
15	Managua	Managua	Café Cyber Space	PALI 20vrs. Abajo. Linda Vista	30	2.5		50	1hr.	IFX	128 Kbps.	1.43		0.04		1.07	0.21		
16	Managua	Managua	@ Internet.com	Fte. Centro comercial Linda Vista	10	2.14													
			Precio promedio sector alrededores del C.C. Linda V. (*)			2.62													
17	Managua	Managua	Cyber City	RUPAP 40 mts. Abajo	14	2.14		40	1hr.	Newcom	128 Kbps								
18	Managua	Managua	Cyber café Rivera	RUPAP 40 mts. Abajo	13	1.79		25	1hr.	Newcom	128 Kbps								
19	Managua	Managua	Cyber Land	Iglesia Pío X 1/2 c. Abajo. Bello Horizonte	10	1.79		150	1hr.	Newcom	128 Kbps	1.07	2.86			0.71	0.21		
20	Managua	Managua	Cyber sitio	semáforos colonial 200 mts al sur	6	2.14													
			Precio promedio sector alrededores de Bello Horizonte (**)			1.96													
21	Managua	Managua	Café-tmx	metrocentro	15	3.57		50	1hr.	Telematix	64 Kbps.								
22	Managua	Managua	´@ kiosk	Plaza Inter	10	2.86		30	1hr.	Ibw	2 MB								
23	Managua	Managua	fonocenter	Plaza Inter	8	2.86		25	1hr.	IFX	64 Kbps.								
			Precio promedio de los ubicados en Mall´s			3.10													
24	Managua	Managua	Kafé ´@ Internet 2	CST 120 mts. Al sur, Bolonia	10	2.79				New com	128 Kbps								

25	Managua	Managua	Cyber ´@ Center	CST 150 mts. Al sur, Bolonia	7	2.86		10	1 hr.	New com	128 Kbps								
			Precio promedio sector alrededores de Bolonia			2.82													
	Chinandega																		
26	Chinandega	Chinandega	TEC	De donde fue el BANIC media cuadra arriba	10	gratis, para alumnos		nd	nd	IBW, TMX									
27	Chinandega	Chinandega	Cybernet	De donde fue el BANIC 1 y media cuadra arriba	6	2.14		nd	nd	IBW									
28	Chinandega	Chinandega	S.T.C. Cía. limitada	Bo. Sta. Ana	3	2.14		nd	nd	IBW									
	Leon																		
29	Leon	Leon	El Sesteo	Esquina opuesta a Catedral de Asunción	10	2.14		10	1hr.	UNAN	64 Kbps.								
30	Leon	Leon	Puerto Café	Costado Norte de la UNAN	15	2.14		35	1 hr.	Alianza									
31	Leon	Leon	Capuccino Internet	Plaza Siglo XXI, esq. Bancos media arriba	8	2.14		25	1hr.	IBW									
32	Leon	Leon	León Net	Iglesia Recolección 75 vrs. Arriba	8	1.79				IBW									
33	Leon	Leon	Colegio Asunción	Fte. Parque central	6	1.79				UNAN									
			Precio promedio León			2.00													
	Jinotega																		
34	Jinotega	Jinotega	J & M Intercafe	Gasolinera Texaco 1c oeste	5	3.2857	1.4285714	15	0.5	IBW	33 Kbps	0.7143						0.3571	
			Precio promedio Jinotega			3.29													
	Matagalpa																		
35	Matagalpa	Matagalpa	CompuAcess	Parque Dario 1c al Norte	9	2.7143	1.7857143	30	0.25	IBW	33 Kbps	1.0714				0.3571	0.2143	0.5	Se encuentra cotizando una estacion VSAT
36	Matagalpa	Matagalpa	Internet Express	Enel 1 1/2 Oeste	5	3.4286	1.0714286	20	0.25	IBW	33 Kbps	0.7143	3.571429	0.0714		0.5714	0.2143	0.2143	Cuenta de Telefono muy caro

37	Matagalpa	Matagalpa	XiBiSoft System	Texaco 1/2 Oeste	6	2.1429		8	0.17	TMX	33 Kbps	1.0714	5.714286	0.0714			0.2143	0.5714	Esta por cerrar. Telefono muy caro
			Precio promedio Matagalpa			2.76													
	Esteli																		
38	Esteli	Esteli	CyberPlace	Calle Central de Acodep 1/2 al sur	> 10														El más grande de Esteli
39	Esteli	Esteli	Nicarao Internet	De la farmacia Esteli 1/2 c al sur	4	2.8571	2.5714286	10	0.5	IBW	33 Kbps	0.7143				1.0714	0.3571	0.5	Se duplico el valor de la factura
40	Esteli	Esteli	Café@net	Frente Inst. Sn Fco	4	2.5	1.0714286	15	0.25	IBW	33 Kbps			0.0357			0.2143		Se Cae la conexión
			Precio promedio Esteli			2.68													
	Boaco																		
41	Boaco	Boaco	Centro de servicios de Desarrollo Empresarial	Donde fue el Banco del Café	10	8.5714				IBW	33 Kbps								
42	Boaco	Boaco	Donde Mario Sobalvarro	Donde Mario Sobalvarro	1	7.1429				TMX	33 Kbps								
43	Boaco	Boaco	ENITEL Suc. Olama	Barrio Olama	1	7.1429		8	0.17	TMX	33 Kbps								
44	Boaco	Boaco	Colegio Rubén Darío	Salida de Boaco	20														Se encuentran en instalación
			Precio promedio Boaco			7.62													
	Chontales																		
45	Chontales	Juigalpa	Quiosco Tecnológico Enr. Bolaños	Enitel 1 c. Este	4	0.7143				Americable	128 kbps.								
46	Chontales	Juigalpa	Americable	Enitel 2 c. Norte	3	2.1429				Americable	128 kbps.								
47	Chontales	Juigalpa	Juigalpan	ESSO 1 c. Este, media norte	13	0.8333				Americable	128 kbps.								
48	Chontales	Juigalpa	INATEC-INTAE Josefa Toledo	ESSO 100 vrs. Este	40	1.4286				Americable	128 Kbps.								
			Precio promedio Chontales			1.28													
	Carazo (Jinotepe)																		
49	Carazo	Jinotepe	Cyber-Land	Parque Central 1c 1/2 al norte	10	0.7143			1		128 Kbps	0.7143						0.3571	Se Encuentran cambiando se de lugar
50	Carazo	Jinotepe	Ciegi	Del Pali 3c al norte 1/2	5	1.785			1		128 Kbps								

				Oeste		7													
			Precio promedio Jinotepe			1.25													
	Rivas																		
51	Rivas	Rivas	Comsys	Centro	4	4.43		5	0.5	IBW	33k								
52	Rivas	Rivas	Centro Cyber	Centro	4	4.43		5	0.5	IBW	33k								
53	Sn Juan del Sur	Rivas	Cyber-Café	Centro	3	4.43		5	1	IBW	33k								
54	Sn Juan del Sur	Rivas	Cyber Beach Café	Centro	5	4.43		10	1	IBW	33k								

Appendix 6 – Telecenters and telekioss installed or planned by the CONICYT, SIA-MAGFOR, MECD, SINIA MARENA y TELECOR projects (March 2002)

Departamento	Municipio	CONICYT/ INATEC[9]	SIA-MAGFOR[10]	MECD[11]	SINIA-MARENA[11]	TELCOR[11]
Boaco	Boaco			1		1
Boaco	Camoapa	1		1		1
Boaco	San José de los Remates					
Boaco	San Lorenzo					
Boaco	Santa Lucía					
Boaco	Teustepe			1		
Carazo	Diriamba	1		1		1
Carazo	Dolores					
Carazo	El Rosario					
Carazo	Jinotepe	2		1		1
Carazo	La Conquista					
Carazo	La Paz de Carazo					
Carazo	San Marcos	1		1		1
Carazo	Santa Teresa			1		
Chinandega	Chichigalpa	1				1
Chinandega	Chinandega	3		1		1
Chinandega	Cinco Pinos					
Chinandega	Corinto					1
Chinandega	El Realejo					
Chinandega	El Viejo	1		1		1
Chinandega	Posoltega			1		
Chinandega	Puerto Morazán					
Chinandega	San Francisco del Norte					
Chinandega	San Pedro del Norte					
Chinandega	Santo Tomás del Norte					
Chinandega	Somotillo			1		1
Chinandega	Villa Nueva					
Chontales	Acoyapa	1		1		
Chontales	Comalapa					
Chontales	El Coral					
Chontales	Juigalpa	1		1	1	1
Chontales	La Libertad	1		1		
Chontales	San Francisco de Cuapa					
Chontales	San Pedro de Lovago					
Chontales	Santo Domingo	1				
Chontales	Santo Tomás			1		1

[9] Installed

[10] Planned but not yet installed

[11] Planned school computer labs

Chontales	Villa Sandino					
Estelí	Condega			1		1

Departamento	Municipio	CONICYT/ INATEC	SIA-MAGFOR	MECD	SINIA-MARENA	TELCOR[1]
Estelí	Estelí	1		1	1	1
Estelí	La Trinidad	1		1		
Estelí	Pueblo Nuevo			1		
Estelí	San Juan de Limay	1				
Estelí	San Nicolás					
Granada	Diriá			1		
Granada	Diriomo					
Granada	Granada	1		1		1
Granada	Nandaime			1		
Jinotega	El Cua - Bocay					
Jinotega	Jinotega	1		1		1
Jinotega	La Concordia					
Jinotega	San Rafael del Norte			1		
Jinotega	San Sebastián de Yalí			1		
Jinotega	Santa María de Pantasma			1		
Jinotega	Wiwili - Jinotega	1				
León	Achuapa			1		
León	El Jicaral					
León	El Sauce	1	1			
León	La Paz Centro	1				1
León	Larreynaga					
León	León	3		1	1	1
León	Malpaisillo			1		
León	Nagarote					
León	Quezalguaque					
León	Santa Rosa del Peñón					
León	Telica	1		1		
Madriz	Las Sabanas					
Madriz	Palacaguina			1		
Madriz	San José de Cusmapa					
Madriz	San Juan del Río Coco					
Madriz	San Lucas					
Madriz	Somoto	1		1		1
Madriz	Telpaneca					
Madriz	Totogalpa			1		
Madriz	Yalaguina					
Managua	Ciudad Sandino	1				1
Managua	El Crucero					
Managua	Managua	9		5	1	12
Managua	Las Maderas			1		
Managua	Mateare			1		

Departamento	Municipio	CONICYT/ INATEC	SIA-MAGFOR	MECD	SINIA-MARENA	TELCOR
Managua	San Francisco Libre					
Managua	San Rafael del Sur			1		
Managua	Ticuantepe	1		1		1
Managua	Tipitapa			1		1
Managua	Villa El Carmen		1	1		
Masaya	Catarina			1		
Masaya	La Concepción					
Masaya	Masatepe			1		1
Masaya	Masaya	1				1
Masaya	Nandasmo					
Masaya	Nindirí	1		1		
Masaya	Niquinohomo					
Masaya	San Juan de Oriente					
Masaya	Tisma					
Matagalpa	Ciudad Darío			1		
Matagalpa	El Tuma - La Dalia					
Matagalpa	Esquipulas					
Matagalpa	Matagalpa	1		1		1
Matagalpa	Matiguás					
Matagalpa	Muy Muy		1			
Matagalpa	Rancho Grande					
Matagalpa	Río Blanco			1		
Matagalpa	San Dionisio					
Matagalpa	San Isidro	1		1		
Matagalpa	San Ramon					
Matagalpa	Sébaco					1
Matagalpa	Terrabona					
Nueva Segovia	Ciudad Antigua			1		
Nueva Segovia	Dipilto					
Nueva Segovia	El Jicaro					
Nueva Segovia	Jalapa			1		1
Nueva Segovia	Macuelizo					
Nueva Segovia	Mozonte					
Nueva Segovia	Murra					
Nueva Segovia	Ocotal	1		1		1
Nueva Segovia	Quilali					
Nueva Segovia	San Fernando					
Nueva Segovia	Santa María					
Nueva Segovia	Wiwilí - Nva. Segovia					
RAAN	Bonanza					
RAAN	Prinzapolka					

Departamento	Municipio	CONICYT/ INATEC	SIA-MAGFOR	MECD	SINIA-MARENA	TELCOR
RAAN	Puerto Cabezas	1		1		1
RAAN	Rosita					
RAAN	Siuna	1				
RAAN	Waslala					
RAAN	Waspán	1				
RAAS	Bluefields	2		1		1
RAAS	Bocana de Paiwas					
RAAS	Corn Island			1		
RAAS	El Ayote					
RAAS	El Rama	2				1
RAAS	El Tortuguero					
RAAS	Kukra Hill					
RAAS	La Cruz del Río Grande					
RAAS	La Desembocadura del Río Grande					
RAAS	Laguna de Perlas	1				
RAAS	Muelle de los Bueyes	1				
RAAS	Nueva Guinea	1	1			
Río San Juan	El Almendro					
Río San Juan	El Castillo					
Río San Juan	Morrito					
Río San Juan	San Carlos	1		1		1
Río San Juan	San Juan del Norte					
Río San Juan	San Miguelito					
Rivas	Altagracia	1				
Rivas	Belén					
Rivas	Buenos Aires					
Rivas	Cárdenas	1				
Rivas	Moyogalpa			1		
Rivas	Potosí					
Rivas	Rivas	2		1		2
Rivas	San Jorge			1		
Rivas	San Juan del Sur			1		
Rivas	Tola	1		1		
Total 176		**59**	**4**	**63**	**4**	**46**

Appendix 7 – List of abbreviations and acronyms

Abbreviation	
ACDI	Agencia Canadiense de Desarrollo Internacional
AIN	Asociación de Internet de Nicaragua
ASDI	Agencia Sueca de Desarrollo Internacional
BID	Banco Interamericano de Desarrollo
BIRD	Banco Internacional de Reconstrucción y Desarrollo
BM	Banco Mundial
CA	Centroamérica
CERAP	Comité Ejecutivo para la Reforma de la Administración Pública
CNE	Comisión Nacional de Energía
CONICYT	Comisión Nacional de Ciencia y Tecnología
CXI	Central Internet
ENITEL	Empresa Nicaragüense de Telecomunicaciones S.A
ENTRESA	Empresa Nacional de Transmisión Eléctrica S.A.
ESTESA	Estaciones Terrenas de Satelites S.A.
FCOSER	Fondo de Contravalor Suizo para Electrificación Rural
FITEL	Fondo de Inversión de las Telecomunicaciones
FO	Fibra Optica
GEF	Global Enviromental Facility (Fondo Mundial para el Medio Ambiente)
IBN	Ingreso Bruto Nacional
IGV	Impuesto General al Valor
INATEC	Instituto Nacional Tecnológico
INE	Instituto Nicaragüense de Energía
INIFOM	Instituto de Fomento Municipal
MAGFOR	Ministerio Agropecuario Forestal
MAR	Sistema multi-acceso de telefonía rural
MECD	Ministerio de Educación, Cultura y Deporte
NICATEL	
ONG	Organizaciones No-Gubernamentales
PC	Computadora Personal
PIB	Producto Interno Bruto
PNUD	Programa de las Naciones Unidas para el Desarrollo
PROCOMPE	Proyecto de Competitividad
PSI	Proveedor de Servicios de Internet
PSTN	Red Telefónica Pública Conmutada
POP	Puntos de Presencia
PYME	Pequeñas y Medianas Empresas
RRCA	Red Regional de Centroamérica
SIA	Sistema de Información Agrícola
SIGFA	Sistema Integrado de Gestión Financiera, Administrativa y Auditoria
SIPAC	
SISEC	Sistema de Información para el Servicio Civil

Abbreviation	
TELCOR	Instituto de Telecomunicaciones y Correo de Nicaragua
TIC	Tecnología de Información y de Comunicaciones
UCRESEP	Unidad de Coordinación al Programa de Reforma y Modernización del Sector Público
UIT	
UNESCO	Organización de las Naciones Unidas para la Educación, la Ciencia y la Cultura