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for the

Ministry of Information & Communications (MOIC)

Sector Overview Report

for

**Study on Increasing ICT Access in Rural and
Peri-urban Areas of Nepal (PS-4)**

December 23, 2004

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ACRONYMS AND ABBREVIATIONS

ADDCN	Association of District Development Committees of Nepal
AEC	Agro-Enterprise Centre
AEPC	Alternative Energy Promotion Centre
AP	Access Point
APDIP	Asia-Pacific Development Information Programme
APT	Asia-Pacific Telecommunity
ASYCUDA	Application System for Custom Department Administration
ATM	Automatic Teller Machine
B2B	Business to Business
BBC	British Broadcasting Corporation
BPC	Butwal Power Company
CAN	Computer Association of Nepal
CBS	Central Bureau of Statistics
CCI	Chamber of Commerce and Industry
CD	Compact Disc
CDMA	Code Division Multiple Access
COPPADES	Committee for the Promotion of Public Awareness and Development Studies
DANIDA	Danish International Development Agency
DDC	District Development Committee
DEC	Distance Education Centre
DEO	District Education Office
DHO	District Health Office
DHQ	District Headquarters
DLGSP	Decentralised Local Governance Support Programme
DOE	Department of Education
DOH	Department of Health
DSL	Digital Subscriber Line
DTO	District Technical Office
DVB	Digital Video Broadcast
DWSS	Department of Drinking Water Supply and Sewerage
DoLIA	Department of Land Information and Archives
EC	European Commission
EMIS	Education Management Information System
ERIS	Election Results Information System
ESAP	Energy Sector Assistance Project
ESEWA	Enterprise Support for Empowering Women and Artisans
ESP	Enabling State Programme
EU	European Union
FCGO	Financial Controller General Office
FCHV	Female Community Health Volunteer



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FM	Frequency Modulation
FNCCI	Federation of Nepalese Chambers of Commerce and Industry
GDP	Gross Domestic Product
GIS	Geographic Information Systems
GMPCS	Global Mobile Personal Communication System
GNP	Gross National Product
GSM	Global System for Mobile Communications
HLCIT	High Level Commission for Information Technology
HMG	His Majesty's Government
HMIS	Health Management Information System
HPL	Himal Power Limited
ICIMOD	International Centre for Integrated Mountain Development
ICT	Information and Communication Technology
ICT4D	Information and Communication Technology for Development
IDA	International Development Association
IDP	Internally Displaced Persons
IDRC	International Development Research Council
IP	Internet Protocol
IPP	Independent Power Producers
IPR	Intellectual Property Rights
IPT	Integrated Property Tax
IRD	Inland Revenue Department
IREF	Interim Rural Energy Fund
IRO	Inland Revenue Office
IS	Information Systems
ISD	International Subscriber Dialling
ISP	Internet Service Provider
ISPAN	Internet Service Provider Association of Nepal
IT	Information Technology
ITPF	IT Professional Forum
JREPD	Jhankre Rural Electrification and Development Project
JV	Joint Venture
LGP	Local Governance Programme
LIS	Land Information System
LSGA	Local Self Governance Act
MARTS	Multi-Access Radio Telephone System
MCHW	Maternity Care Health Worker
MCT	Multipurpose Community Telecentre
MHFG	Micro-hydro Functional Group
MIS	Management Information System
MLD	Ministry of Local Development
MOES	Ministry of Education and Sports



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MOIC	Ministry of Information and Communications
MOST	Ministry of Science and Technology
MSI	Media Services International
MW	Megawatt
MoWR	Ministry of Water Resources
MuAN	Municipal Association of Nepal
NCC	National Computer Centre
NEA	Nepal Electricity Authority
NGO	Non-governmental Organisation
NITC	National Information Technology Centre
NORAD	Norwegian Agency for Development Co-Operation
NPIX	Nepal Internet Exchange
NR	Nepalese Rupee
NT	Nepal Telecom
NTA	Nepal Telecommunications Authority
NTV	Nepal Television
ODC	Organisation Development Centre
OPGW	Over Power Ground Wire
PCS	Professional Computer System Ltd
PCO	Public Call Office
PC	Personal Computer
PDA	Personal Digital Assistant
PDDP	Participatory District Development Programme
PHC	Primary Health Care Centres
POP	Point of Presence
PPP	Public Private Partnership
PSTN	Public Switched Telephone Network
RE	Rural Electricity
REDP	Rural Energy Development Program
RLU	Remote Line Unit
RMC	Rural Market Centre
RUPP	Rural-Urban Partnership Programme
SAARC	South Asian Association for Regional Co-operation
SAPAP	South Asia Poverty Alleviation Programme
SDH	Synchronous Digital Hierarchy
SECEN	Society of Electronics and Communication Engineers
SFDBL	Small Farmer Development Bank Limited
SIM	Security Identity Module
SME	Small and Medium Enterprises
SPPD	Support Services Policy and Programme Development
SPV	Solar Photovoltaic
STD	Subscriber Trunk Dialling



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TLO	Tole/Lane Organisation
TRIPS	Trade-Related Aspects of Intellectual Property Rights
TTF	Thematic Trust Fund
TV	Television
UIC	Urban Information Centre
UK	United Kingdom
UN	United Nations
UNCITRAL	United Nations Commission on International Trade Law
UNDP	United Nations Development Programme
US	United States
UTL	United Telecom Ltd
UUCP	Unix-To-Unix Copy Protocol
VAT	Value Added Tax
VDC	Village Development Committee
VHF	Very High Frequency
VHW	Village Health Worker
VRS	Voters Registration System
VSAT	Very Small Aperture Terminal
WIPO	World Intellectual Property Organization
WLAN	Wireless Local Area Network
WLL	Wireless Local Loop
WiFi	Wireless Fidelity
WiMAX	Worldwide Interoperability for Microwave Access

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1 INTRODUCTION

1.1 Structure of this report

This Sector Overview Report is presented to the Ministry of Information and Communications as an early deliverable in the project *Increasing ICT Access in Rural and Peri-Urban Areas of Nepal*, in accordance with the detailed requirement in the Terms of Reference. It is structured as follows:

- Section 2 surveys the overall rural environment, with particular reference to its natural, demographic and economic characteristics;
- Section 3 looks more closely at rural development and planned non-telecom infrastructure in rural areas, including electricity, water, and roads;
- Section 4 provides a national perspective on the evolution of the Information Technology sector;
- Section 5 covers broadcasting, and especially its legal framework;
- Section 6 is a detailed overview of the telecommunications and Internet sector, including network development;
- Section 7 covers a range of rural ICT interventions already undertaken.

Additional material provided in a range of Annexes includes:

- A detailed survey of Nepalese legal provisions as relevant to the ICT sector (Annex-5)
- Taking stock of telecentres movement in Nepal by Manohar K. Bhattarai (Annex-6)
- A list of relevant websites (Annex-7)

1.2 Key points arising

The main purpose of this report is to provide a factual base for the rest of the project. The next stages will be to formulate strategies for increasing access to ICTs in rural and peri-urban Nepal, and then to study demand and to plan, implement and document a pilot project. Accordingly the report includes a large amount of detailed material which it would not be appropriate to try to summarise. Still, we must not lose sight of some important points which arise.

Difficulties faced

- The current conflict makes development efforts of any kind much harder. Of course this includes provision of rural ICTs. But, unlike Nepal Telecom's telecom infrastructure, community ICTs (whether telecentres or community radio) have not to date been targeted for damage.
- Existing rural telecoms infrastructure is seriously lacking. In much of rural Nepal it does not exist. Where it does exist, it usually does not have a data capability sufficient for functional Internet access.



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Strong points

- Nepal benefits from a lively private sector in ICT, with several active trade and professional associations.
- There is much enthusiasm and commitment around Nepal for using new ICTs, especially among younger people. Computers are gradually becoming available in educational institutions, and where computer education is available it is popular and well-used.
- Community radio is already a successful model for low-cost and effective rural ICTs.
- Considerable experience of rural telecentres in Nepal is already available from several pilots. Lessons include the need for continuity of external support in a flexible manner, which is sensitive to actual local needs.
- There is potential for providing rural telecentres at Ilaka level, where other services (both private and public) tend to be clustered.

Regulatory action needed

- Internet use outside main towns is severely hampered by the need to pay long distance rates for connection to a private sector Point of Presence. Nepal Telecom's provision of local call rate access in 55 District Headquarters is welcome, and now must be made available to all ISPs.
- Adoption of the new Telecoms Policy 2004, with its emphasis on open competition, was an important step towards overcoming many problems, which will best be dealt with by new entrants who are free to use any available technology.
- But the Policy now urgently needs to be implemented. Luckily, progress in this area can be made by amending existing regulations, without waiting for the passage of a new Telecom Act.
- For the time being, more active regulation of monopoly behaviour is required, in particular to ensure that private sector ISPs can obtain good quality leased circuits promptly and at reasonable prices.
- Free or at least easy access to "WiFi hot-spot" spectrum (as in most other countries) is important to allow valuable new technological opportunities to be exploited.

Institutional learning

- An organisational and physical base for rural ICTs is provided by current programmes for decentralised local governance.
- A possible institutional model for managing subsidies is found in the Alternative Energy Promotion Centre.
- Take-up of IT by central Government, though growing, does not yet extend to widespread use of email for communicating with outstations or the public.



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2 OVERALL RURAL ENVIRONMENT

2.1 Terrain

Nepal is situated on the southern slope of the Himalayas in the Indian subcontinent. A landlocked country between China and India, it is rectangular in shape and has an area of 141,000 square kilometres. The country is largely mountainous. It rises South to North in several chains of hills which lie in an East-West orientation from an altitude of some tens of metres up to 8,800 metres of towering Himalayas. This creates three parallel ecological zones which also almost run East to West.

The southernmost belt of Tarai low land lies below 300 metres in altitude, the mid hilly region from 300 metres to 3000 metres, and the high alpine Himalayan region is above 3000 metres in altitude. Tarai low land occupies 17% of the land area and has a tropical climate, well suited for agriculture. Mid hill zone occupies 64% of the land area and has a mild to temperate climate which is suitable for horticulture and some agriculture. The mountain region occupies the rest of the land area and is relatively cold and suitable for livestock and grazing. This terrain produces huge challenges in establishing roads and other infrastructure in the hilly and mountainous part of the country to improve the life of the people.

2.2 Population and population distribution

According to the latest census, of 2001, Nepal's population was 23,151,423. The annual average growth rate of population during the last decade i.e. 1991-2001 was 2.25 percent (CBS 2002). Distribution of population according to ecological region is respectively 1.69 million (7.39 %), 10.25 million (44.3%) and 11.21 million (48.4 %) in mountain, hills and terai. About 14.2% people live in urban area and 85.8% in rural. The census of 2001 has indicated that currently the literacy rate among the population of 6 years or older in Nepal is 54 percent with male literacy rate of 65 percent and female literacy rate of 43 percent. The current gender gap in literacy rate is nearly 23 percentage points but this is decreasing.

The main part of the statistical information is from two publications of the Central Bureau of Statistics:

- Report on the household consumption survey of rural Nepal 2000 / 2001 (most rural data below); and
- Population census 2001, National Report (most data for entire Nepal below).



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Figure 1: Population, area and population density by region, entire Nepal.

Region	Population million	Households million	Area sq km	Population density persons / sq km
Eastern	5.344	1.013	28456	188
Central	8.032	1.475	27410	293
Western	4.571	0.863	29398	155
Mid-Western	3.013	0.534	42378	71
Far-Western	2.191	0.367	10539	112
Total	23.151	4.253	138181	157

Figure 2: Population density by region and ecological belt, persons/ sq km, entire Nepal.

	Mountain	Hill	Terai
Eastern	38	153	454
Central	88	300	422
Western	4	152	333
Mid-Western	14	107	168
Far-Western	50	118	205
Average	33	167	330

Figure 3 shows the size distribution of localities (VDCs and municipalities).

Figure 3: Size distribution of localities (VDCs and municipalities)

Size class (persons)	Localities	% Localities	Households	% households
1-999	70	2	9,915	0.2
1000-4999	2396	62	1,464,790	35.1
5000-9999	1067	27	1,269,428	30.4
10000-19999	285	7	694,216	16.6
20000-	71	2	736,025	17.6
Total	3889	100	4,174,374	100.0

The Figure clearly shows that some 89% of VDCs and 65% of the population are in the range of 1000 - 10,000 persons, corresponding to about 160 - 1600 households. The figures do not tell the entire truth for planning purposes, as planning for telecoms would need information on settlements rather than VDCs. Anyway the portion of population that resides in VDCs with less than 1000 persons is negligible.

Municipalities are defined on the basis of their population exceeding 10,000. To date 58 municipalities including one metropolitan (Kathmandu) and four Sub-metropolitan cities (Biratnagar, Birgunj, Lalitpur and Pokhara) have been established and in the next election, further expansion has been proposed. Despite their municipal status, many of these places are still largely rural or peri-urban in character.



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Urbanisation is a recent phenomenon in Nepal in comparison to other countries and Nepal is the least urbanised country after Bhutan in the South Asian region. The size of the urban population in Nepal is estimated to be three million people and the average annual growth rate of 4.2 percent in urban areas almost twice the national average of 2.4 percent. However, in some municipalities, the growth rate is higher than seven percent. If this increment continues, by 2010 the share of urban population will exceed seventeen percent of the total population of Nepal, i.e., some five million urban dwellers. Inevitably this rapid growth is leading to many people living in peri-urban areas with little or no basic infrastructure (electricity, water, or of course telecoms).

The most sparsely populated areas, and probably most difficult areas to serve, are in the mountain region, in particular Western and Mid-Western mountain areas. Nepalese authorities are well aware of these difficulties.

Figure 4 shows the number and proportion of population that were abroad in 2001.

Figure 4: Number and proportion of population that is abroad.

	Total	India	Saudi Arabia	Qatar	America	UK + Germany	East Asia	Total %	India %
Eastern	121,911	67,338	23,179	9,249	1,147	1,916	9,028	2.3	1.3
Central	107,631	63,508	13,873	4,547	6,661	3,273	6,317	1.3	0.8
Western	331,880	263,180	27,775	10,164	1,566	3,464	13,727	7.3	5.8
Mid-W.	94,721	90,006	2,475	376	116	193	655	3.1	3.0
Far-W.	106,035	105,018	158	54	67	63	209	4.8	4.8
Total	762,178	589,050	67,460	24,390	9,557	8,909	29,936	3.3	2.5

UK and Germany are the major Western European destinations. "East Asia" here covers China, Korea, Japan, Hong Kong, Malaysia and Singapore, which are the major East Asian destinations.

A total of 0.76 million Nepalese, 3.3% of the population, were abroad at the time of the Census, most of them working. By far the most popular country is India, in particular for the Mid-West and Far-West development regions. The largest portion of the population abroad is in the Mid-West, 7%, and (astonishingly) the smallest in Central, 1.3%. About 27,000 Nepalese stay in industrialised countries. These numbers now are much greater because of migration due to conflict as well as accelerated growth in people seeking foreign employment. This has significance for ICT demand, because people need to get in touch with their kin.

2.3 Ethnicity, language and religion

Nepal is a multi-ethnic, multi-lingual and multi-religious society. The Nepalese are descendants of three major migrations from India, Tibet, and central Asia. Classification of population by caste and ethnicity is only tentative. The census of 2001 has listed 103 caste/ethnic groups including "unidentified group". The caste system of Nepal is basically rooted in Hindu religion. On the other hand, the ethnic system has been rooted mainly in



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mutually exclusive origin myths, historical mutual seclusion and the occasional state intervention. The major caste/ethnic group identified by the 2001 census are Chhetri (15.8%) Brahmin Hill (12.7%), Magar (7.1%), Tharu (6.8%), Tamang (5.6%) Newar (5.5%), Muslim (4.3%), Kami (3.9%), Rai (3.9%), Gurung, (2.8%) Damai/Dholi (2.4%). Other caste and ethnic groups constitute less than 2 percent of the population.

Since the 1971 census only 20 or less languages have been tabulated; however, the National Language Policy Advisory Commission has listed 60 living languages in the kingdom. According to the 1991 census more than 50 percent of the total population has Nepali as their mother tongue followed by Maithili (12%). Other main languages are Bhojpuri, Tharu, Tamang, Newari, Magar, Rai and Abadhi. The following languages are spoken by less than one percent of the population: a) Santhal (0.04%) b) Thakali (0.04%), c) Danuwar (0.13%) and d) Satar (0.14%).

Nepal is constitutionally a Hindu kingdom with legal provisions of no discrimination against other religions. The Hindu population in the country has been consistently over 80 percent since the 1950s. The second largest religion in Nepal is Buddhism, practiced by about 11 percent, while Islam constitutes about 4.2 percent of the population. Kirat religion accounts for nearly 3.6 percent of the population. Certain animistic practices of old indigenous religions survive.

2.4 Nepal's development situation

Nepal ranks among the world's poorest countries with a per capita income of just over \$240. Based on national calorie/GNP criteria, an estimated 38% of the population is below the poverty line. An isolated, agrarian society until the mid-20th century, Nepal entered the modern era in 1951 without schools, hospitals, roads, telecommunications, electric power, industry, or a civil service. The country has, however, made progress toward sustainable economic growth since the 1950s and is committed to a program of economic liberalization.

Nepal remains a semi-feudal economy with about 88% of the total population living in rural areas and about 81% of the population engaged in the agricultural sector, with agriculture holding 42% of the total GNP of the country. The feudal land relation can be judged by the fact that 65% of poor peasants own only 10% of land while 10% of rich peasants and landlords own 65% of land. This is reinforced with gender-bias in the production relations between men and women, as women are barred from inheriting their parental property. In fact about 8% of the total population owned more than 55% of productive land and more 50% of population have only about 8% of land.

The people of Nepal have enjoyed moderately rising levels of per capita incomes and achieved remarkable success in improving human development indicators during one decade of democracy. The changes are associated with increased monetization of economic activities, spread of literacy and education and increased contact with the outside world through travel and migration. However, these achievements are being negated by a stalemated armed conflict that has lasted since 1996.



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The ongoing conflict has not only severely weakened the economy but has inflicted a permanent psychological scar on the victims and those who are close to them. The conflict is killing development initiatives and destroying the livelihood of poor rural communities. The reduction or curtailment of service delivery in some of the areas has had a negative impact on the poor in rural communities thereby exacerbating their suffering. Pursuance of socio-economic development is central to reducing the incidence of conflict but the insurgency has significantly threatened the development programmes of the government leaving the major development interventions in the hands of international and national development organisations and civil society organisations.

Local government bodies exist only in name and many now admit, be it reluctantly, that in many of the districts, government presence is in district centres while Maoists control a large swathe of the hinterland. Resolution of the conflict problems is yet to take place. Unless the conflict is resolved peacefully it will be difficult for any project or programme to deliver services effectively to the suffering masses in the conflict affected areas.

2.5 Rural economic activities

Agriculture remains Nepal's principal economic activity, employing over 80% of the population and providing 38% of GDP. Only about 25% of the total area is cultivable; another 33% is forested; the rest is mainly mountainous. Rice and wheat are the main food crops. The lowland Terai region produces an agricultural surplus, part of which supplies the food-deficient hill areas. Because of Nepal's dependence on agriculture, the annual monsoon rain, or lack of it, strongly influences economic growth.

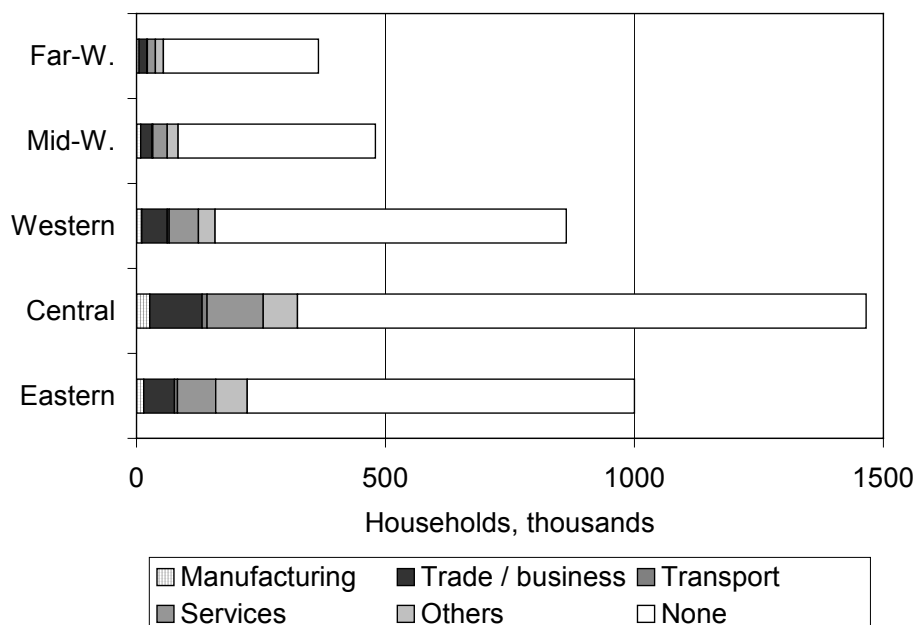
Figure 5 shows the number of households that operate non-agricultural small-scale economic activities. The majority of the population is involved in agriculture. A total of 840,000 households have non-agricultural economic activities, varying in the range of 15 - 22% of total households. Most of such households probably serve the immediate vicinity, but could perhaps extend their market area if communications were available. The figures do not show any significant difference between the regions.



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Figure 5: Households with economic activities, entire Nepal.

The most common activities are trade / business and services. Transport is the rarest activity, ranging from 10,000 households (Central) to 1000 households (Far-Western). Transport needs communications, to agree on what, when and where to transport, even for regular transport such as daily routes.

2.6 Rural purchasing power and consumption

Data on purchasing power and consumption patterns are for the rural population only, excluding municipalities. The Figure shows that there are no really large differences in consumption. The largest differences are that Mid-Western and Far-Western consumption is below national average (81% and 68% of average), while Central is close to average, and Eastern and Western above average (109% and 116% of average). Average consumption in Far-Western is only 59% of consumption in Western. The ratio between the highest and the lowest figure is 1.7.



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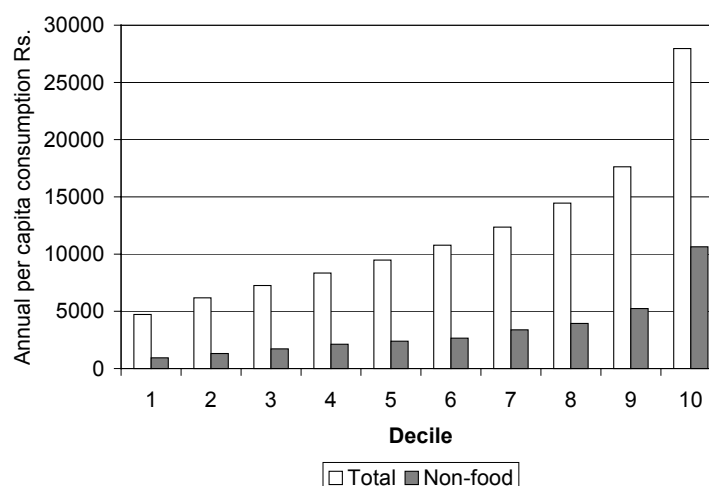
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Figure 6: Average per capita consumption by region in rural areas, Rs. per year.

	Total	Food	Non-food	Housing	Own account ¹
Eastern	12,994	8,483	3,394	603	514
Central	12,181	7,456	3,435	849	441
Western	13,824	7,779	4,459	935	651
Mid-Western	9,719	5,474	2,986	673	586
Far-Western	8,115	5,056	2,236	500	323
Nepal	11,928	7,221	3,447	749	511
Mountain	12,214	8,089	2,818	710	597
Hill	12,868	7,658	3,714	857	639
Terai	11,085	6,694	3,339	664	388

The figures should be compared to GDP / capita, which was Rs 16,500 in year 2000. Urban consumption is higher than rural. Average rural consumption per capita was Rs 11,928, corresponding to US\$ 170.

Figure 7 shows consumption per decile².

Figure 7: Average consumption per decile, rural Nepal.

The Figure shows that consumption spread by decile is significant, much larger than the spread between regions. The total consumption of the highest decile is six times as much as the consumption of the lowest decile, and eleven times for non-food items. The poorest have to use a higher share for food. All non-food items are purchased or bartered, not own account production.

¹ Own account means own production of goods and services.

² Decile means that the population is divided in ten equal parts, in this case in order of consumption.



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3 RURAL DEVELOPMENT AND INFRASTRUCTURES

3.1 Overall structure and plans

The public sector in Nepal comprises three subsectors: the central Government, local and municipal authorities, and state-owned enterprises. The central Government has 21 ministries, 9 constitutional bodies, and 108 development boards. There are 5 Regional administrations, 75 district development committees, and 3,914 village development committees. There are 46 state-owned enterprises. The civil service in Nepal was originally established for land administration, collection of land revenue, maintenance of law and order, and dispensation of justice. The present civil service in Nepal is governed by the amended Civil Service Act 1998.

Devolution and decentralisation of central government authority has started with respect to management of resources and development activities within the district and municipalities. The Ministry of Local Development (MLD) is the coordinating Ministry in the centre.

There are three levels of locally elected representatives who oversee the functions within their area: District Development Committee (DDC), Village Development Committee (VDC) in rural areas and Municipality in urban areas, and Ward Committees (Wards) of VDCs and Municipalities, with locally elected members. Under the Local Self Governance Act (LSGA), these bodies have been given substantial powers to manage local development.

The Ilaka level, intermediate between Districts and VDCs, has no formal administrative role but does have a potential service centre function. Banking, health facilities, post office, schools, and small markets all seem to congregate in close proximity, forming a growth centre for public services. These centres were targeted to have health posts, Ilaka post offices, Agriculture and Live Stock service centres. Ilakas also generally have commercial operations requiring modern communications facilities. The status of Ilakas will be further verified through the district database, which is under preparation, and field visits. Annexes 1, 2 and 3 document meetings/interviews held, gist of primary issues discussed and findings of field visits made to telecentres, community radio stations and ICT facilities.

3.1.1 Local development programmes

The long term vision of local development is to provide the people of different classes and communities with an equal opportunity of access to basic services, benefits and resources, and to create flourishing civil society with their active participation, and to make improvement in the living standard of the local people with the coordinated efforts of the well organized local bodies. This vision entails an objective to minimize poverty by making available to local people, particularly the people of socially and economically backward areas, caste, nationalities and groups, easy access to services and benefits.

Local development here means the projects and programmes which are virtually managed by local bodies: DDCs, VDCs and Municipalities, in general, in cooperation with line agencies, donors, and civil society. The subject is as much related with institutional development of



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these local bodies as local development activities that are to be managed by these bodies. Though Municipalities may sound urban, they too are local bodies concerned with empowerment of local people to manage their own problems and issues of development. The main concept of local development is to explore and identify development programmes, mobilize local resources in a coordinated manner, and run these programmes using local skills and technology for meeting the needs of local people.

Participatory planning and implementation of projects within their areas is very much the desired goal of decentralisation and devolution. A Local Governance Support Programme has been running for several years in a number of districts, previously under two different names, PDDP and LGP. Its coverage has grown gradually from a few districts to its present level of 60 districts and 662 VDCs. Now these programmes are grouped under one name, Decentralised Local Governance Support Programme (DLGSP), and programmes are running to develop these institutions in the country within a proper legal framework. The Programme will include all 75 districts and 1000 VDCs by the year 2004/2005.

From last year's DLGSP Annual Report we derive the following information of particular interest to this project:

- Computer networking installed in 20 Districts. The networking is within the DDC's internal units only in the following districts - Siraha, Sindhupalchowk, Dolakha, Bara, Makwanpur, Morang, Jhapa, Lalitpur, Udayapur, Banke, Bhaktapur, Chitwan, Dadeldhura, Kanchanpur, Kaski, Nawalparasi, Palpa, Tanahu, Kavre, Dhankuta.
- Computer accounting package installed in 25 Districts
- District CD-ROM prepared in 6 Districts
- E-mail system started in 25 Districts

Over the years the Programme has evolved taking into account the need for institutional development right from the settlement, village and VDC level to district level. It seeks to empower people at the settlement and village level to take increasing control of their own development and enhance their capacities to channel resources for poverty reduction. The Programme supports improvement of governance at VDC and settlement levels through the creation of self-governing and self-sustaining community organisations. At the district level the Programme supports strengthening of programming and management capabilities of DDCs. At the central level, the Programme supports the MLD and National Planning Commission in formulating policies that reflect and support local development initiatives.

As time goes along decentralisation or handing over of health, school, and postal service management to VDC is being thought about, and in the case of primary schools it is being implemented in a number of VDCs and it will continue to grow. This definitely will warrant email and Internet facilities at the VDC levels. VDC premises, though several of them damaged due to conflict, could be a candidate location of community telecentres as the situation improves.



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3.1.2 The Tenth Five-year Plan: targets and strategies

The following quantitative progress in local development is targeted for the Tenth Plan period (2002-2007):

- Periodic plans of all districts and municipalities will be prepared and implemented.
- *Information centre (including Geographical Information System, GIS) will be set up and strengthened at all DDCs and municipalities. Information system will gradually be set up and operated at VDCs too. Poverty mapping will be implemented in selected districts.*
- District Transport Master Plan will be prepared in all districts.
- Local Development Fund will be set up at local bodies (DDCs, VDCs and municipalities).
- Various village development programs and other target programs will be implemented by coordinating with all programs implemented through social mobilization in all VDCs.
- Every year 1,200 km rural and agricultural roads, and 600 km earthen roads will be constructed, 250 km gravel roads will be rehabilitated, 5,000 km will be regularly repaired and 600 km will be periodically repaired; altogether 20,000 km roads will be operational at the end of the Tenth Plan.
- Similarly, 500 new suspension bridges will be built; 1,200 bridges will get comprehensive repair and maintenance; 2,000 suspension bridges will get minor maintenance.
- A labour-intensive and environment friendly technology training centre will be set up and operated for making the local infrastructure development work qualitative and effective.
- *Training will be provided to 1,200 DDC office holders, 50,000 VDC office holders and 1,500 municipal office holders (including women representatives) in the first year and the second year of elections. In addition, study tour and orientation training will be provided to 52,600 persons.*
- Training suitable to their responsibility will be provided to assistant level staffs of the second grade working at the local bodies.
- Poverty alleviation, social mobilization and self-employment programs will be implemented at all Village Development Committees and municipalities benefiting the households concerned with these programs.
- A computerized accounting system will be introduced at all DDCs and municipalities, and at some VDCs.



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Small-scale rural infrastructure development, social capital mobilization, skill development and various income generating activities can make special contributions to the national goal of poverty eradication. Similarly, programs on institutional development and strengthening of various concerned agencies will be equally important in making local development more effective. In this context, the **main strategies of local development** will be:

- Direct involvement of stakeholders in every phase of plan formulation, implementation, monitoring and evaluation of development programs to be implemented at the local level,
- Focus of local development programs on the people of neglected and oppressed caste and nationalities, backward groups, and on backward geographical areas identified based on locally available resources and on a development indicator. Implementation of special programs targeting the area and the community having the incomes below the national average,
- Continuous enhancement of coordination and cooperation among the programs implemented at the local level,
- Use of environmental friendly and labour-intensive technology for implementation of development programs at the local level.

To sum up, implications of current local development programmes for ICTs include:

- The organisational framework is in place to enable a large number of communities to include ICT requirements in their participatory planning processes (and indeed, some are already doing so).
- An increasing number of DDCs and VDCs already have some ICT infrastructure, provided as part of the programmes described above, even if this is generally for the use of local authorities rather than the public. Section 4.3.3 below provides more detail.

3.2 Rural electricity development

For two reasons, we consider rural electricity (RE) developments in some depth:

- The spread of rural electricity will be a vital underpinning for extension of the reach of ICTs.
- The institutional arrangements for rural electricity development may include useful models for rural ICT development.

Rural electricity is mainly achieved through an extension of the national grid for the locations which are economically reachable through the grid, and through micro, mini and small hydro plants grouped under local grids for difficult and remote locations. *The former is under the mandate of the Ministry of Water Resources (MoWR), which executes through the Nepal Electricity Authority (NEA). The latter is under the mandate of the Ministry of Science and Technology (MoST) which implements through the Alternative Energy Promotion Centre (AEPC).* Micro hydro plants (up to 100 kW) are currently under the jurisdiction of AEPC. The history of use of mini and micro hydro schemes in Nepal dates from 1962.



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The Water Resources Strategy 2002 emphasizes active participation of rural communities and private entrepreneurs. It aims at electrifying 43%, 60%, and 80% of the nation's households respectively by the end of years 2007, 2017 and 2027.

Another source of electricity on an isolated or localized basis is through solar photovoltaic systems (SPV). Use of SPV system for home application is a rather recent phenomenon. Several Independent Power Producers (IPPs) and NGOs are engaged in rural electrification with assistance from donors.

3.2.1 Plans and policies

The Tenth Plan emphasizes RE for the development of Nepal's rural economy. Of the total outlay for transmission and distribution of electricity during the plan period, 96% has been allocated for RE. Out of this 65% has been allocated for developments in the Eastern, Mid-Western and Far-Western regions which are relatively poor in receiving electricity services. The **major quantitative targets** of the Tenth Plan in the Electricity Sector that pertain to RE are as follows:

- To extend grid-electrification to an additional 10% of the country's population. An additional 14 districts will thus be connected to the national grid during the plan period. An additional 5% of the total population (12% of the rural population) is to receive electricity from alternative energy sources.
- To install electricity generating capacity equivalent to 10 MW from micro hydro in 47 districts.
- To generate 3.7 MW equivalent of electric energy from 52000 solar systems in 52 districts.
- During the plan period, fifty micro hydro projects, whose feasibility studies have been completed, will be implemented through the Alternative Energy Promotion Centre (AEPC) with active participation by VDCs, IPPs, community based cooperatives etc. Identification of new projects will be carried out and implemented.
- The major grid-extension projects to be implemented in this period are the Kailali-Kanchanpur Rural Electrification Project (under construction) and the mid and Far Western Rural Electrification Project (covering 8 districts).
- Apart from that there are small budget rural electrification programs in various districts.
- Twenty two 33 kV transmission lines and forty-six 33/11 kV substations are to be constructed during this plan period.

The Hydropower Development Policy 2001 emphasizes the tying of up electrification with economic activities:

- Electrification of remote rural areas shall be encouraged by operating small and mini hydropower projects at local levels.
- The existing public sector institutions shall be restructured.



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- Communities, cooperative institutions, local bodies and the private sector will be encouraged in the generation, transmission and distribution of hydropower.
- Appropriate arrangement to undertake RE shall be made while granting electricity distribution licenses.
- RE shall be encouraged in the rural areas directly affected by the electricity generation projects. Energy royalty on the electric energy consumed shall be exempted in such areas. Such exemption will be allowed for the first fifteen years from the date of commercial operation of the projects.
- One percent (1%) of the royalty received by the government from hydroelectric projects will be provided to those VDCs that are directly affected by the structures of such projects. This amount shall only be utilized for rural electrification in the project area.
- RE fund shall be established for the development of micro hydro and RE by pooling in a certain percentage of the amount received as royalty from hydroelectric projects.
- The government will provide grants through AEPC to the domestic private sector to generate and distribute electricity by building projects of up to 100 kW capacities at the rural level. Moreover, such projects shall be included in the prioritized loan sector, and facilities will be provided to such schemes accordingly.

3.2.2 Institutions

As already mentioned, rural electrification is developing through two National Agencies, NEA and AEPC under the new Rural Energy Development Programme (REDP), and private sector led Independent power Providers (IPP). Below we look at each in turn.

3.2.2.1 RE under NEA

Altogether 31 small hydro schemes totalling a capacity of 5.51 MW and two solar photovoltaic schemes totalling 100 kW have been constructed by NEA. Eleven schemes have been leased out to the private sector. At present two small hydro schemes totalling 900 kW are under construction. Techno-feasibility studies for rural electrification in 26 districts of Far Western, Mid Western, Western and Central Development Regions have been completed. The *Kailali-Kanchanpur Rural Electrification Project*, financed through a Danish grant, will connect 30,000 new households in 34 VDCs of Kailali and Kantipur districts by 2005/06. The **Power Development Fund (created with IDA contribution)** will support supply and installation of equipment and materials, and civil works for the extension of NEA's sub-transmission and distribution systems to rural areas and towns not electrified.

3.2.2.2 RE under REDP and AEPC

From 1990 to 1995, before REDP/AEPC were set up, the Agricultural Development Bank, rural communities and entrepreneurs, and a number of national and international NGOs supported micro-hydro projects in Nepal. About 240 micro hydro schemes generating 4 MW of electricity and about 880 peltric schemes generating 1.5 MW were implemented, with subsidy covering typically 65% to 80% of the cost of such schemes. A population of about 400,000 has been served by these schemes.



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Development of the sector gained momentum from the mid 1990s with the establishment of the UNDP-sponsored *Rural Energy Development Program (REDP)* and the AEPC. More detail on the REDP and its relationship with AEPC is provided in Box 1: below. The DANIDA-supported long term Energy Sector Assistance Project (ESAP) has been instrumental in supporting AEPC. AEPC promotes micro hydro and solar energy projects by providing technical support for project development as well as end-use development. AEPC is also active in improved stoves, and possibly in wind in future. AEPC was created in November 1996 as the lead national institution for the promotion of renewable energy, acting as an intermediary between the activities of NGOs at grassroots level and the activities of relevant Government institutions involved in the definition of rural energy policies. Its task is to prepare support programmes that can be financed by national and donor sources, and to monitor and evaluate the activities of NGOs and other private organisations that execute components of its programmes.

AEPC also manages a subsidy scheme for all these components of energy through an *Interim Rural Energy Fund (IREF)*. Although established in 1996, AEPC did not become operational before 1998. In the case of micro-hydro schemes, on the request of the community or investor, AEPC conducts a pre-feasibility study of the project. If found suitable, AEPC asks the applicant to conduct a feasibility study and prepare a detailed design. Around 33-40 thousand rupees are provided as subsidy for this work, which may or may not be sufficient for the study depending of the size and complexity of the scheme. The project is appraised by AEPC and then a subsidy is provided on a prescribed basis. The applicant selects among consultants or contractors who have been pre-qualified for the respective task by AEPC to ensure quality, satisfactory performance and transparency in the process of passing on the subsidy. The subsidy is managed by a committee.

The IREF (Interim Rural Energy Fund) has committed subsidies to the tune of Rs. 3 Billion from ESAP. This will ultimately benefit about 38200 households with a generation of about 1700 kW from micro-hydro systems and about 870 kW from solar home systems. NORAD has also joined in the programme. EU also has recently joined and is committing US\$15 million out of which \$10 million is for subsidy and \$5 million for technical assistance. EU is primarily targeting for solar energy development for Institutional applications. Under ESAP, private sector is eligible for micro-hydro schemes.

Box 1: Background on the REDP and the AEPC

- The implementation of the REDP project has been changed into the national execution modality from 1 April 2002. Under the new modality, the Ministry of Science and Technology (MoST) is the implementing agency and the AEPC has been designated for coordinating government policies with REDP operations. The Rural Energy Development Programme (REDP: NEP/ 95/016) was started on 16 August 1996. The programme had been formulated building upon the experiences of both His Majesty's Government of Nepal and United Nations Development Programme (UNDP) in enhancing decentralized, people-centred local development in general and the promotion of rural energy technologies in particular in the country. The main focus areas of the REDP have been development of rural energy systems, preservation of natural environment, improvement of local economies, building local people's capacity, local resource mobilization and enhancement of local processes and institutions.



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- The REDP implements its activities through a joint collaboration with (1) the government agencies for policies and coordination; (2) the local bodies for planning, management and resources mobilization; (3) the private sector for technical services; (4) NGOs for community mobilization; and (5) community people for operation and management as owners.
- Encouraged by the track record of REDP, part of the proceeds of the World Bank assistance from Power Development Fund is being utilized through REDP since 2003. This particular component will support the scaling-up of community-based micro-hydro village electrification by developing about 2.5 to 3.0 MW of new micro hydropower systems to serve some 30,000 consumers and will extend electrification activities from the 15 districts currently served to another ten more districts.
- REDP was able to establish 101 micro hydro systems to generate power of 1312.5 kW and installation of 1538 solar home systems by the end of year 2002. The programme has mobilized resources from different stakeholders to fund the local level operations in the programme districts.
- Program implementation is decentralized through local government, i.e., District Development Committees (DDC) and the Village Development Committees (VDC), and involves formation of a micro-hydro functional group (MHFG) at each participating community. The Alternative Energy Promotion Centre (AEPD) assumes overall management of this project component. Further, through UNDP co-financing, the existing REDP project support unit will be strengthened to support the increased level of micro hydro system development envisaged.

3.2.2.3 RE under the Private Sector

Private sector RE has its origin in various small hydro schemes. Most of these were implemented with donor assistance and the involvement of NEA between 1978 and 1992. These were basically developed for off-grid RE in areas away from the existing grid lines. Except for some labour input by the beneficiaries and the payment (in some cases) of connection fees, the schemes were largely financed through grants. In later years, privatization of these schemes took place.

Two Independent Power Producers (IPPs) are presently engaged in donor assisted RE. The *Butwal Power Company (BPC)* has built three small hydro schemes so far – the Tinau Khola (1MW) now owned by NEA, the Andhi Khola (5 MW) and the Jhimruk (12 MW). BPC owns and operates the latter two, sells power to NEA and is engaged in RE in the districts in the vicinity of the generation plants. The *Himal Power Limited (HPL)*, which has built, owned and operated the 60MW Khimti scheme, is now engaged in the Jhankre Rural Electrification and Development Project (JREPD). More than 5000 households are to be electrified under the project.

3.2.3 Implications of Rural Electricity for ICTs

Electricity is a vital component for all electronic ICTs, whether radio, TV, or computers or communications equipment. Rural electrification is going to be a slow process, irrespective of well-defined strategies and satisfactory institutional arrangements.

For isolated installations in communication terminal location, community telecentre, and school premises, proper power systems can be engineered. These systems will have costs of their own depending on type and amount of electrical energy consumed by the ICT equipment. Part of the off peak hour energy which could be generated by micro-hydro systems could usefully be stored for use in these ICT installations.



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In the rural environment, ICTs will require charging of batteries and use of efficient invertors, whether the electricity is from solar or hydro. Micro-hydros are likely to operate for only few hours. Even where grid supplies are present, the supply of rural electricity could suffer from long interruptions or low voltages due to system overloads. Solar systems are designed with batteries for charge storage for use of electricity when there is no daylight. As such they will require storage to be designed according to duration of use of the appliance. In both cases, a rural grid supply backed up with batteries may be necessary, raising costs of the power system.

Solar is more reliable but more costly. Solar institutional systems may be available for community owned telecentres or schools. However, design for them will have to be particularly low power consuming technology to conserve power and reduce costs.

In conclusion, costs of low energy consuming equipment and appliance, and operation policy from time and period consideration will affect the **total cost of ICT facilities**.

3.3 Other physical infrastructure

3.3.1 Roads

The Department of Roads is responsible for the construction and maintenance of major roads along with urban roads and district roads. The construction and maintenance of local district roads is the responsibility of the Department of Rural Infrastructure and Agricultural Roads under the Ministry of Local Development.

According to the Nepal Road Statistics 2000, a total of 15,905 km. road have been constructed, of which 29 percent is blacktopped, 24.9 percent gravelled and 46.1 per cent earthen roads. In the Ninth Plan period alone, over 4000 km of rural road, about 1000 km of earth road, over 2000 km of mule track and about 1000 suspension bridges were constructed and over 1000 km of road was rehabilitated under various infrastructure development projects throughout the kingdom in rural areas.

The Roads Department has a programme to connect 10 more districts with roads to bring the tally of total districts connected to 70. Apart from this, under the local development plan there is quite a large investment in agriculture roads, local roads, suspension bridges and local mule tracks for rural areas.

Road density in Nepal is measured as a weighted sum of different categories of road (in km) expressed as a percentage of 100 sq km of the total surface area. Large increases have been reported in recent years, but road density for the 75 districts still varies radically³:

- Kathmandu, Bhaktapur, and Lalitpur have road densities over 80% (40%).
- 23 other districts in the eastern half of the country, mainly in the Terai but also some hilly districts, have road densities over 16% (7%).

³ Figures taken from Districts of Nepal: Indicators of Development, ICIMOD/SNV, Update 2003. Figures in brackets show roughly the corresponding picture from the original 1997 version.



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- 23 districts, comprising the rest of the Terai and some more eastern hilly districts, have road densities over 6% (1%).
- The remaining districts, including most of the mountain areas, have road densities under 6% (1%).

To sum up, despite all the development efforts mentioned above, large parts of the country effectively have no roads. Apart from a few areas near airports, settlements are normally reached only on foot. Implications for ICTs include:

- ICTs have great potential to reduce isolation and improve service delivery in mountain areas. Even where electronic communications have to rely on relatively expensive satellite technology, they will often be a highly cost-effective way of providing services – much cheaper than building roads.
- There is an opportunity to reduce costs by integrating the provision of terrestrial communications network infrastructure with the road-building programme.

3.3.2 Drinking water

By the end of the Ninth Plan, 71.6 percent of the total population had access to drinking water. This left 28.4 percent of the population deprived of drinking water facility, a basic need of life. The Tenth Plan will therefore:

- Provide basic drinking water service to all regions of the kingdom by gradually upgrading the level of services by the end of the plan period.
- Provide appropriate sanitation facilities in urban as well as in rural areas by increasing public awareness.
- Assist to reduce child mortality rate by controlling water borne and water induced diseases and thereby help to increase income generation through opportunity of utilizing saved labour from illness.
- Involve private sector in the overall management of urban water supply systems/facilities and also in the improvement and up-gradation of drinking water projects.

Targets in more detail include:

- Provide basic drinking water service to additional 4.591 million people including 3.852 million rural and 0.739 million urban population within the Tenth plan period.
- Provide a high level service to 1.334 million people and medium level service to 2.668 million people by upgrading the drinking water supply system.
- Sanitation facility will be provided to 7.421 million people including 5.613 million from rural and 1.808 million from urban areas by motivating the households to construct private toilets.
- Public awareness on personal hygiene and sanitation will be increased through mass publicity and training programs within the Tenth Plan period.



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The Department of Drinking Water Supply and Sewerage (DWSS) and the Rural Drinking Water and Sanitation Fund Development Board have played important roles in the extension and promotion of drinking water and sanitation facilities in the rural areas. In hill areas, drinking water are supplied by constructing gravity projects based upon surface water, but in terai region hand pump, deep boring and wells are being constructed, since in most of the terai area underground water can be exploited easily. In scattered settlements, traditional sources of drinking water services will be improved and protected, since pipe distribution system is expensive.

In keeping with the local development approach described earlier in this chapter, rural drinking water supply is now community-based. Under the World Bank/IDA Credit financing made through the Rural Drinking Water and Sanitation Fund Development Board, the target is to provide basic drinking water service to 0.950 million population by implementing 1,260 rural community drinking water and sanitation schemes within the Tenth Plan period.

A study on community based rural drinking water project is under implementation with the support of the Asian Development Bank. About 560 thousand people are estimated to benefit from this project within the Tenth Plan period. Non-governmental organization/private sector and the government agencies will assist consumers' groups/committees in selecting and prioritizing projects. However, the sole responsibility of maintaining the project after completion lies with the consumers' groups/committees. The District Technical Office (DTO) will make available necessary technical support for this.

The DWSS will assist the consumers' groups if the project is large in size and its beneficiaries exceed 1,000 people. The DWSS will also help in quality improvement aspect and rehabilitation as well as technically complicated projects. The Departmental role would be of a facilitator during the project implementation stage.

The implications of the drinking water situation for ICTs are:

- Most communities without drinking water will regard remedying this as a very high priority – generally, higher than ICT provision.
- Experience that communities gain in planning and implementing their drinking water supplies will stand them in good stead for future development projects, including ICT provision.

3.4 Service infrastructure

3.4.1 Postal services

Postal service has very wide coverage. In each district there are three levels of post offices. Hierarchically, the District Post Office is on the top and it is located in each district headquarter. There are 842 Ilakas Post Offices that fall in the next lower level and are located in the towns and villages of a district. Additional post offices numbering 3074 in total are located one per VDC.



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District and Ilaka Post Offices are housed generally in Postal Department owned premises and are staffed adequately by the Department's regular employees, in numbers depending upon the size of operations.

Additional Post Offices are run by agents hired on a temporary basis. Each Additional Post Office generally has also at least a runner and a postman also hired on a temporary basis. These temporary employees get a nominal remuneration which is much less than those in other Post Offices. Additional Post Offices are intended to be housed in VDC premises and as such these Post Offices may not have adequate room to locate equipment and for people that a telecentre may require.

From the level of the staffing in Ilaka and higher Post Offices it appears possible to train manpower to operate and run telecentres. Post Offices themselves will require email-like facilities if e-Post plans are to be implemented.

3.4.2 Health posts

Health services have also fairly good coverage of the country. There are 9 Zonal Hospitals, 71 district hospitals, and 205 Primary Health Care Centres (PHC). Department of Health (DOH) manages all government hospitals, health posts, and public health centres through its district health offices (DHO). Every district has been divided in 9 Ilakas, thus each of 675 Ilakas has one Ilaka Health Post consisting of at least one doctor. Every VDC has a Sub Health Post and has a Village Health Worker (VHW) and Maternity Care Health Worker (MCHW). One Female Community Health Volunteer (FCHV) is assigned to every ward.

About 4000 doctors, 4000 staff nurses, 4000 Anamikas (nurses), and 4000 Auxiliary Health Workers) work in Health services as regular employees of the Health Department. About 50,000 health volunteers who do not receive any remuneration support the immunization, family planning and other campaigns of the Health Department locally in VDCs.

DHO send public health information from Ilaka Health Post and curative information from district/Zonal/regional hospitals. Extensive involvement of all levels including FCHV is made in collection of these data. From process of origination of data through prescribed forms from FCHVs to final processing at the centre takes 2 months to deliver the reports to all concerned authorities for management.

The Centre processes and produces progress reports two months after collection of the information from the local level, as to how the programmes are proceeding, and actions required from respective project heads and project offices.

Apart from the communication access requirements for HMIS, the other systems that may require heavier communications between centre and rural areas could be in health information dissemination, health education, and tele-medicine and e-governance applications. The use of PDAs for survey data collection in a Vitamin A survey and others are under trial and would require data communication between PDAs in rural areas and the computers in the centre.



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3.4.3 Schools and colleges

Department of Education (DOE) under the Ministry of Education and Sports (MOES) manages the schools through its District Education Offices (DEO). There are 25,927 primary (grades 1-5), 7289 lower secondary (grades 6-8) and 4350 secondary (grades 9-10) schools with 3.6 million, 960 thousand, and 370 thousand students in each category respectively. On average each VDC has 6 primary schools. Although on average more than one lower secondary and one secondary fall in each VDC, they are not uniformly distributed in terms of VDCs or even Districts. However, each District has several secondary schools.

In addition, Nepal's five universities have campuses spread around the country, and there are 12 technical schools, 3 polytechnics and around 170 affiliated private training schools, in 47 Districts.

The District database which is being prepared for the study will contain district wise information for project reference. Under government professed IT policy, each secondary school at least will require a computer education facility, which will be their compulsory part of curriculum by year 2010. Therefore, well before the first decade of the new millennium is over such computer learning centres need to be included in the schools. As such, secondary schools should be the target for computer facilities, be it networked or otherwise, in the first instance. These schools form one of the logical centres for Internet facilities to be established which could serve the community as well as the schools. Gradually the requirements will be also in the lower secondary and primary levels.

The Distance Education Centre (DEC) of MOES has been established with following objectives:

- To train primary teachers through radio and other modes of learning.
- To broadcast useful and non-formal education programmes assisting teachers and others involved in educational activities in the community.
- To assist the total education system of the country for wider educational opportunities for the people of Nepal.

At the moment 7000 primary teachers are enrolled for 330 hours of training (which involves 226 hours of broadcast - 30 minutes 6 days a week, 59 hours of contact, 35 hours of practice teaching and 10 hours of examination sessions). This type of activity has been running for several years.

Similar programmes can be carried out in many areas where large number of teachers and field workers are involved, using whichever ICT technology is most appropriate. For example, the Agriculture and Livestock Departments also run many programmes through field workers located in service centres, as do the Postal and Health Departments.

Overall, it is clear that MOES and DOE, together with other Departments with large field forces such as Agriculture, have a lot of potential demand for rural access to ICTs.



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4 INFORMATION TECHNOLOGY SECTOR

4.1 Introduction

This is a brief overview of a large topic. Much more information is available, for example in the 2003 International Trade Centre's Country Profile of Nepal⁴ (which assigns Nepal an e-readiness score of 1.7 out of 9), and in the forthcoming report on ICT Resources in the Kingdom of Nepal, reporting on desk and field research carried out by MountDigit Technology for the HLCIT⁵.

4.1.1 Some history

IT in Nepal is a young sector. For the first time in Nepal, Central Bureau of Statistics (CBS) used an IBM 1401 for processing of 1971 population census. National Computer Centre (NCC) was later established in 1974 to fulfil the data processing requirement of Nepal. NCC provided the initial thrust in computerization in Nepal. In 1990 NCC collapsed in the face of competition with the private sector. Before 1990, NCC carried out most of Nepalese government and semi government's data processing and computerization works.

4.1.2 Trade associations

Trade associations have been and remain very important in the development of the sector. Computer Association of Nepal (CAN), an association of IT industry and professionals, established in the early 1990s, is the lead agency which plays the role of promoting IT for National Development. IT Professional Forum (ITPF) was established as a professional body of ICT professionals and a sectoral member of CAN in 2000 and works for ICT to play a role in the development of Nepal along with taking care of the interests of its members. Internet Service Provider Association of Nepal (ISPAN) is another active trade association, in this case of ISPs working for the common interest of ISPs in the private sector.

4.1.3 Use of websites and e-mail

A number of Ministries and government departments have websites now⁶. But still quite a few of them have still to establish them. Most of the websites seems to suffer from insufficient information posted in them and keeping websites up to date also appears to be a problem. The industry also lacks in web presence. E-mail is not used in the government transactions, though it finds application in dealing with private sector.

⁴ Report by Rajib Subbu, in the series: B2B E-MARKETPLACES: Current Trends, Challenges and Opportunities for SMEs Exporters in Developing Countries of Asia and the Pacific

⁵ Advance sight of a draft Executive Summary has kindly been made available to us.

⁶ A good summary of these is provided at <http://www.geocities.com/rnecairo/hmginfo.html>



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4.1.4 Electronic Transaction Act

Electronic Transaction and Digital Signature Ordinance has recently been promulgated. The government has already prepared the draft for necessary regulation for the effective implementation of the ordinance. Proper infrastructures such as certification authorities, payment gateways etc also need to be installed in place. This will facilitate electronic transactions in business and government. The Ordinance also deals with computer crime issues to some extent.

4.2 IT Policy 2000 and the HLCIT

Government brought out IT Policy 2000. The Policy resulted in establishment of National Information Technology Centre (NITC) in 2002 and High Level Commission on Information Technology (HLCIT) as an apex body under the chairmanship of the Prime Minister. The duties of the HLCIT are:

- to provide strategic direction and help formulate appropriate policy responses for the development of ICT sector in the country, for harnessing these technologies to meet key developmental challenges, including governance reform, and catalyzing economic growth for poverty reduction.

NITC works as the secretariat for HLCIT. Ministry of Science & Technology (MOST) had started the work for the IT Park in Kavre and HLCIT is completing the project very soon with an objective of software & services export. HLCIT is also finalizing the business plan for the IT Park and is trying to bring foreign companies in it increasing the employment status especially in ICT sector. The 10th Five year plan for the sector is shown in Box 2.

Box 2: Policy and working policy of 10th Five Year Plan

- Emphasis will be given to education and trainings related with Information Technology.
- National information centre running under the Science and Technology ministry will be strengthened in order to implement, supervise and monitor policies related with Information Technology and to legalize e-commerce.
- Information technology parks will be established in various parts of the country.
- Conducive environment will be created to attract domestic and international investment in industries related with development, to encourage production and utilization of soft ware and services such as data entry, digitization, and medical transcription, call centre, web content design etc.
- International training will be encouraged to produce high and medium level manpower and to produce highly skilled manpower to compete in the international front.
- Developing and promoting Information Technology to relay information on agriculture, education, health and other economic sectors to rural areas will be emphasized. The attempt will be made to provide Internet services to 1500 VDCs across the country.
- Website containing information on agriculture, education and health will be launched.
- Initiatives will be taken to incorporate computer education in the school curriculum.



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- Private sectors will be encouraged to campaign on nature, religion, culture and heritage through Internet service.
- The participation of private sectors in Information Technology arena will be encouraged.
- Information Technology will be used to make government activities transparent, to strengthen system that provides service and to reform financial management and administration. In this regard, e-governance will be properly handled.
- Conducive environment will be created to increase the use of services related to Information Technology. To legalize the use of Information Technology necessary laws will be formulated.
- Private sectors will be encouraged to produce medium level manpower necessary for Information Technology front. Private sectors will be provided assistance to set up academic, research and development institutes.
- Emphasis will be given to computer education from school level. Internet facilities will be provided in universities and public schools to provide better quality computer education.
- Scholarships will be provided to bright but needy students from rural areas for higher-level education on information technology.
- Information technology will be used for the purpose of electricity business, electronic education and distance health. Academic institutions and hospitals situated where there is facility of telecommunication and electricity will be encouraged to use the service of information technology. And where there is no electricity facility, promotion of Information Technology will be done through solar energy.

4.3 Absorption of ICT in Government

4.3.1 Main systems used by central Government

Nearly all central Government Departments by now have adopted some IT systems. However, the type and status of these varies greatly. This section describes major features of the main systems, with particular reference to branch structures, which may have implications for rural ICTs.

Inland Revenue Department (IRD) has already implemented Income Tax Registration System and VAT Accounting System in all of its 21 Inland Revenue Offices (IRO). IRD works with IROs on an off-line basis. The complete income tax processing system is under development and will be implemented in the near future.

Election Commission (EC) has implemented its Voters Registration System (VRS) and Election Results Information System (ERIS) is in operation. EC has 30 districts with computers and is in the process of equipping the rest where electricity is available.

Financial Controller General Office (FCGO) has developed government budget control system and manages expenditures through its district level offices. Data exchange between the centre and the district is required at least once a month.

Department of Customs is implementing ASYCUDA, an application system for custom department administration in 7/8 custom offices where voluminous transactions take place.



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Department of Education under the Ministry of Education and Sports (MOES) administers all schools in the country through its District Education Offices. Computer systems are being used for project monitoring and financial monitoring, and for collecting, compiling, analyzing and reporting through Education Management Information System (EMIS). MOES ICT has a Master Plan for the next 3.5 years which envisages connecting district offices.

Department of Health is running its Health Management Information System (HMIS) as said before. At the Department, computers are networked in a Local Area Network and have access to HMIS information. This system is in operation using FoxPro/Excel in the MIS section.

Department of Immigration has implemented an on line information system to record the embarkation and disembarkation information from Tribhuvan International Airport. The airport immigration office is also connected to Department of Immigration. The system needs to be extended in all entry/exit points of the country in future.

Department of Land Information & Archives (DoLIA) has implemented Land Information System (LIS) with land records in 2 districts (Bhaktapur & Kaski Land Revenue Offices) and this is being implemented in other districts gradually. Spatial data are also being piloted to be stored in the District LIS from Survey Offices in the districts. DoLIA has envisaged creating a computer system at the centre to store all records from all district offices. This application will demand high data exchange if it is to be integrated at the centre. DoLIA will be one of the heaviest users of GIS applications.

4.3.2 RUPP Information System for Municipalities and Rural Market Centres

Rural-Urban Partnership Programme has been active in developing application of information system as decision support as well as in the development of exchange between rural markets and urban areas. A fully functional and comprehensive **Municipal Database** developed at the central level is installed at all 12 partner municipalities. This is the core system for **Urban Information Centre (UICs)**. The system helps in decision process in implementing the objectives of the RUPP. The information system basically covers labour force attributes, rural and urban production, consumption, origin-destination of raw materials, agricultural products, light manufacturing goods, traders and financial resources, existing and potential employment opportunities, scope to improve rural-urban production systems, location and works of traders and middlemen, detailed information on Tole/Lane organization, macro level information of municipalities and other market region information. The established UICs are being strengthened and policy strategy has been developed to upgrade these UICs into Community Resource Centre as envisioned by the IT Policy of HMG/Nepal.

Other systems are:

- **Dissemination of Daily Agri Price Information** Presently all 12 partner municipalities are successfully disseminating daily agri market prices through the use of email, telephone, fax and the use of price bulletin boards in different market places. RUPP in joint collaboration with AEC/FNCCI successfully hosted the Agri Price web site as www.AgriPriceNepal.com for online dissemination of market price



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information of 18 market centres. Tansen municipality has started disseminating daily Agri Price Information through a community radio named MadanPokhara. It is estimated that around three hundred thousand people (farmers/traders) will benefit from the price information.

- **Computerized Integrated Property Tax (IPT):** RUPP has been providing technical and financial support to Butwal municipality. Supports were also provided to Tansen municipality in the collection of household and TLO data to implement integrated property tax system.
- Addressing the issue of Internally Displaced Persons (IDP) database.
- **Initiation of B2B e-Commerce** With AEC/FNCCI, RUPP is providing technical support to establish B2B e-Commerce in all 12-partner municipalities with the objective of poverty alleviation and establishing regional linkages. B2B e-Commerce awareness campaign in 5 selected municipalities was conducted in 100 households with the help of university students in computer science. Development of web site is in the final stage for launching. The web site address is www.b2b.com.np. The web site will be hosted and launched in all partner municipalities in joint collaboration with the local Chamber of Commerce & Industries (CCIs).
- **Initiation of e-Governance** RUPP initiated the idea of implementing e-Governance with the eye on improving administration process (e-administration), connecting citizens (e-citizens, e-services) and building external interactions (e-societies) and improved urban service delivery for public. Information dissemination and allowing people's direct participation in municipal planning and decision-making. It was implemented in Bharatpur Municipality and Hetauda municipality.

4.3.3 Ministry of Local Development and Decentralised Local Governance Support Project

GIS Application, Planning & Progress Monitoring, Application and development of Decentralized Budgeting, Planning & Progress Monitoring along with an ICT master plan being finalised are some examples of IS implementation in MLD.

DLGSP is helping to establish an information system in order to enhance more informed and responsive decision-making in participatory development planning and monitoring. This system aggregates development related data from the grass-roots level to the central level. It provides support to the DDCs for establishing Information & Documentation Centres equipped with comprehensive database and Geographical Information System (GIS) maps, so as to enhance coordination and flow of information among institutions working for local development.

Disaggregated data are collected from the settlements on demography, educational status, household incomes, health/sanitation, water supply, land ownership, agricultural crops, livestock, food sufficiency, infrastructure, transportation, market, migration, natural disasters, etc. VDC delineate/plot most recent services/ infrastructure & road networks on base maps. Data collected in settlements is fed into the computer in the DDC Information & Documentation Centre and forwarded to GIS Facility at MLD for processing. Standardised



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GIS maps and database received from MLD GIS facilitate the DDC local development efforts. This information is shared with those who seek them. MLD/GIS Facility are standardised, processed and linked with digital maps. The resulting District and VDC GIS maps are then sent back to the DDCs. The information is also shared with related ministries. Resource maps of 34 programme districts and poverty mapping of about 27 districts have been completed.

This programme has the plans to establish e-LOC GOV at districts as a low-cost electronically linked Local Governance System to develop a network of information between the Centre and the district as well as fill in information gap between local government and its citizens. The objectives of the e-LOC GOV are to enhance the welfare of rural poor by providing access to information on market prices of commodities and vegetables. Agriculture prices and opportunities, innovative economic activities, health and educational information make locally available. Some initial work on feasibilities has been already commenced.

4.3.4 Other government organizations

There are a number of other government organizations using ICT quite extensively. These organisations will be expanding application systems involving district offices, project offices and the centre. GIS Application, Planning & Progress Monitoring, Census & Surveys in National Planning Commission and present GIS Application and development of Decentralized Budgeting, Planning & Progress Monitoring along with an ICT master plan being finalised in the **Ministry of Local Development** are some examples.

Information, Budgeting, Planning & Progress Monitoring, Financial Management Systems, and Document Management System will be implemented by **Department of Roads, Department of Irrigation, Department of Drinking Water & Sanitation, Department of Agriculture, Department of Live Stock, and National Agriculture Research Centre** along with their building their respective statistics. **Department of Cottage & Small Industry** has plans for on line registration and renewal system, and for industrial information & statistics. **Nepal Police** and **Royal Nepalese Army** will have Personnel Record System, Criminal Records System, Inventory Control System and also Hospital Management System for Royal Nepal Army.

4.4 Private sector IT applications

4.4.1 Financial sector

Almost all banks in urban areas are computerized and have their operations/transactions done only through computers. Some older banks like Rastriya Baniya Bank, Nepal Bank, Agricultural Development Bank; which have larger networks of branches, are also following suit. Increasing use of ATMs is seen. Most of the leading banks, which have branches in peri-urban areas and rural areas, also use computers but inter branch operations are not online due to lack of proper links. There are very few finance companies & financial cooperatives which have multiple branches, and thus these do not require communication access. Insurance companies are another thriving sector, which are computerizing and need good communication facilities between its head office and their branches all over the country.



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The Small Farmer Development Bank Limited (SFDBL) could be one vehicle for extending rural ICT use to Ilaka level and below. With initiation from Agricultural Development Bank and with the involvement of HMG, other commercial banks and small farmer cooperatives, SFDBL was established in 2058 as a joint-venture development bank. The vision of the bank is to provide credits to small farmers cooperatives & similar organizations in rural areas, who provide micro-credits to the rural poor and small farmers for their upliftments. SFDBL has its headquarters in Kathmandu and does its banking operations from 7 Ilaka Offices in Birtamod (Jhapa), Itahari (Sunsari), Mahendranagar (Dhanusha), Ratnanagar (Chitawan), Butwal (Nawalparasi), Pokhara (Kaski) and Nepalgunj (Banke). It has plans to open 2 more Ilaka offices in Gajuri (Dhading) and Dhangadhi (Kailali). 146 Small Farmer Cooperatives Ltd have been formed so far and to date about 80,000 small farmers have already obtained the micro credit services through these cooperatives.

4.4.2 Manufacturing and other sectors

The most widely used application of computers is in accounting, inventory control and payroll. However, computers have been used for helping pre-manufacturing process as well. One example of it is the use of computer programs in carpet industry for designing and graphing of carpets. Tourism industry is also ahead with the use of computers. Almost all of the airlines are equipped with locally developed Airlines Reservation System, MIS, whereas many hotels and travel agents also use locally developed software for their front office, back office, accounting and trekking management work. In the health sector, hospitals are slowly moving into computerization, whereas most of the medicine distributors are already computerized. Most of the pathology labs do not use computers at all, not even for report generation purpose. At the shop-keeping side, only the major departmental stores are computerized, while small and medium sized shops still use manual means.

A forthcoming report on the future of NepalNet subject by ODC (commissioned by IDRC) contains some new information on Internet availability and usage in Nepal, based on interviews carried out in mid-2004 with more than 200 organisations (mainly NGOs), in nine main cities of Nepal. Overall, 88% of the organisations had computers, with only minor variations by organisational type. Nearly all computers in private organisations were connected to the Internet, while only 40% of computers in governmental organisations were connected. For other types of organisation, around 75% of computers were connected to the Internet. Computer literacy of staff ranged from 25% (governmental organisations) to 65% (international NGOs). Despite having reasonable Internet access, 61% of respondents still preferred to get information about Nepal from printed sources, because of limited availability of online content.

4.5 Content and software development

Nepalese software development and production companies have been successful in meeting the national software development demand and do small volume of software exports. Thousands of man-hours worth of software and services are exported every day including development service to reputed companies like Toshiba. It also includes services like backend data entry, medical transcription, call centres and map digitization. A software



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company has been established with fully US investment and successfully running with Nepalese software developers since 1997. Now, we have software and service Joint Ventures with US, Japan, India and etc. The trend of opening up companies offering software application services such as digitization, medical transcription etc especially for export purpose is growing. Highly advanced e-commerce portals are also developed here for the US and Europe. Multimedia CD-ROM of Nepal has acclaimed Pacific & Asia Travel Association (PATA) Gold Award 2000. Off the shelf software products from Nepal are also used abroad.

Figure 8: Number of companies involved in software

S.No.	Service Categories	Number
1	Software Development	74+
2	Universities	4
3	Trading	200+
4	ISP	12
5	Networking	58+
6	System Integrator	26+
7	Training Institute	177+
8	VSAT services Provider	4
9	Pager Services Provider	6+
10	Mobile Service Provider	1
11	IT Enabled Service	29+
12	Consultancy	81+
13	Graphic Designer	24+
14	Web services Provider	13+
15	Service Provider	50+
16	Solution Provider	39+
17	JV Company	9+
18	Interactive Multimedia CD-ROM Developers	3+
19	IT Media	2
20	Others	58+

Source: IT Directory 2001 by CAN, with updates

The figures above are based on extensive study of trade directories

4.6 Human resources development in ICT

Nepal started late in human resource development in ICT sector. Only after 1990, there was tremendous focus of ICT in education. One optional course of computer science was introduced in School Leaving Certificate (SLC) examination syllabus. Later computer science was also introduced in 10+2 syllabus as one of the optional course for that level. Institute of Engineering (IOE), Tribhuvan University (TU) started Fortran Programming as one of the subject in under-graduate level engineering syllabus. Kathmandu University (KU) was the first university to offer computer science and engineering course at the undergraduate level since 1994.



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Four Nepalese universities are offering IT related academic course with annual intake of about 5000 students (see figure 9 below). Courses at all level (undergraduate, post graduate and even doctorate) are being offered. There is more focus in the software in the courses offered by Nepalese universities. The undergraduate degree that have been offered by these universities are as follows:

- Bachelor of Science in Computer Science (B.Sc.)
- Bachelor of Computer Engineering (BE)
- Bachelor of Information Technology (BIT)
- Bachelor of Computer Application (BCA)
- Bachelor of Software Engineering (BE)
- Bachelor of Computer Information System (BCIS) etc.

The number of students going out of the country to study IT courses is not included in this figure. Students are going abroad to India, Bangladesh, Philippines, UK, USA, Australia, CIS (Commonwealth of Independent States) countries, Singapore and Thailand for computer related academic courses. The number of colleges offering IT courses and their capacity was growing every year but is beginning to slow down because of less number of jobs available within the country. There are also a number of colleges being opened with affiliation from foreign universities offering IT courses.

Figure 9: Estimated IT Manpower in Nepal as of 16 May 2002

Universities	Number of Institutions	No. of Students Bachelor Level	No. of Students Master Level	No. of Student Ph. D.	Total
Tribhuvan	13	2032	17	1	2050
Kathmandu	2	504	20		524
Pokhara	15	1477	16		1493
Purwanchal	16	930			930
Total	46	4943	53	1	4997

Source: Institute of Engineering

Private training institutes are now offering long-term professional training courses. Several training institutes in Nepal have been franchised from top class institutions from India, Singapore and UK.



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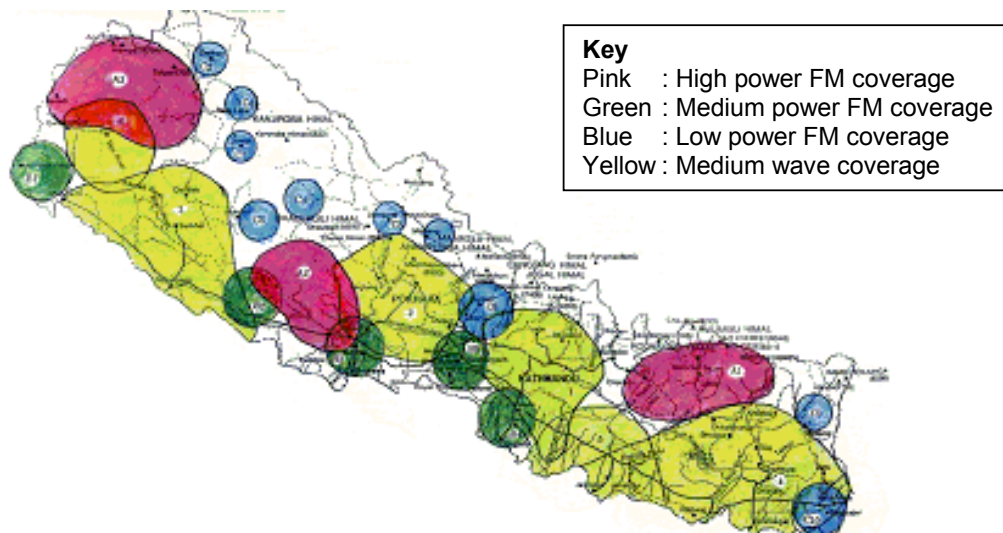
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5 BROADCASTING SECTOR

5.1 Radio

Figure 10: Coverage map of MW and proposed FM radio (source: Radio Nepal)



5.1.1 Radio Nepal

Broadcasting started by establishing Radio Nepal, as a government department on 1 April 1951. Initially, the transmission covered duration of 4 hours and 30 minutes through a 250 Watt SW transmitter. In 1984 it was converted into a Board operating under the Development Board Act (1956).

Radio Nepal currently airs programmes on Short Wave, Medium Wave and FM frequencies. Regular broadcasts cover duration of 16 hours everyday which includes 2 hours of regional broadcasts. However on public holidays, there is an additional 2 hours, extending the total duration to 19 hours.

Its medium wave broadcasts reach about 60% of the population and its policy is to expand the medium wave service to cover the entire population. It has already established six relay stations and some production facilities in other parts of the country.

5.1.2 FM radio broadcasting by private sector

Broadcasting using FM (radio and TV) has been opened to private sector. In 1997 the government issued a license to the first private group to operate a radio station. Radio Sagarmatha stands out as the first independent public broadcasting station not only in Nepal but in the whole of South Asia. The programmes of Radio Sagarmatha are of a public service nature. The station is very popular and has a growing listenership.



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There are now 24 private radio stations already in operation. There are over 25 applications lying with the Ministry of Information and Communication. Many of these applicants are communities which are anxious to set up their own stations, some of them with their own resources. Most of the stations that are operating are commercial stations whose programmes include mostly music, information, quiz and phone-ins. Pokhara has four commercial stations.

5.1.3 Community Radio (FM)

The information on Community Radio has been sourced from the MSI/ESP 2003 Study on Pro-Poor Media. According to the report community broadcasting is an inexpensive medium of mass communication. It encourages the participation of all sections of the local community in terms of ownership and the operation and control of the radio stations. Programmes are broadcast to whole communities, including disadvantaged groups. In general village-based barefoot journalists, farmers, mid-level technicians, local government representatives, village development workers, local artists, school teachers and students get involved in its operation. It is interesting to note that most of these people work voluntarily according to the report. All the decisions as to selection and development of programmes to broadcast is, indeed, done by themselves.

The programmes are mainly about local news and views with debates on local and national issues by local and outside experts. They highlight local talents, skills, technologies, and expertise. They broadcast local advertisements to generate income. They disseminate information which promotes the dignity and well-being of their communities, including on health, sanitation, drinking water, natural resource conservation, disease prevention, family planning, human rights, and democracy.

In the absence of any legal definition of Community Radio the study has categorized, basing their judgement on their organization and functions, only six of the existing 24 FM radio stations as community radio stations. The report further says that Radio Madanpokhara, a 100-watt FM station, located in a village in Palpa district, established in 2000 and owned by the VDC and operated by local volunteers, is truly the only community radio station in Nepal. The five other community radio stations are located in towns and are operating in less clearly identifiable communities.

Further the proponents of the community radios in Nepal have very pragmatic views regarding where it should be installed and where it can succeed. According to them Community Radio is a going concern in the sense that it is tried and practised and works well. As to where the installations go, their view is where the community is committed and they ask first for it. According to them the requirement is creating a substantial fund from which subsidy can flow under strict criteria of its application and monitoring. The numbers that can be handled should initially be in hundreds. They are of the opinion that given the kind of community and low literacy we have this is one of the best electronic media which **benefits** the community. Empowerment of the people, transparency in governance and local development, news, market information for agriculture products, information and also entertainment which benefit them in health and living all were seen as outcome of community radio and community media.



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5.2 Television

5.2.1 Nepal Television (NTV)

NTV is perhaps one of the youngest television stations in Asia. It started as a project in January 1985. Despite doubts felt by many, it began its experimental transmission for Kathmandu Valley in a very modest manner. In those days there were only about 400 TV sets, most used for basically video purposes and some for receiving Door Darshan (Indian National Television) signals.

When Nepal TV went on air with its thirty minutes transmission, the number of TV sets increased dramatically. A 100-watt transmitter to cover Kathmandu valley was used during this experimental transmission. It started its regular transmission of two hours towards the end of 1985.

In February of 1986, it became a full-fledged Corporation under the Communication Act of His Majesty's Government. Established as an electronic medium to enhance the country's socio-economic development, Nepal Television currently covers 42% of the country's population and 32% of the land area. Transmission hours have also increased to 61 hours per week.

NTV has a Metro Channel and is also operating through Satellite for expanding television coverage throughout the country.

5.2.2 Private sector television through satellite

Space Time Network, a private cable TV service provider, launched its commercial satellite channel, Channel Nepal, in July 2001. Satellite and local cable-TV service providers distribute its programmes, mostly in urban areas. Other more recent private operators who are licensed to broadcast through satellite are Ad-Avenue and Shangri-La Channel.

5.2.3 Private sector television in metro area

Image Metro, Kantipur Television, is the terrestrial TV operating in the private sector.

5.2.4 Cable TV operators

There were 257 licensed cable TV operators in Nepal by 2003. It has been estimated that nearly twice as many do not possess a licence. These operators provide service mainly in urban areas. Some operators have their services in electrified rural areas. All cable TV operators distribute programmes that they receive from satellites. Nepal TV and Channel Nepal also take the advantage of cable TV operators to distribute their programmes. Some operators produce and disseminate their own local programmes through their cable networks. These programmes are popularly known as local TV. Local people watch them with great enthusiasm and interest.



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If local programmes could be developed, which is possible because of cost of production equipment going down, cable TV operators could jointly work with the communities to help transmit these programmes through cables which is coming in large numbers.

One regulatory prescription which allows these cable TV joints to proliferate and operate even without licence in rural areas could be of great advantage. They could be authorized to operate by simple notification procedure and their pledge to abide by the regulatory guidelines. In rural and peri-urban areas the communities would benefit because they are the people who watch national as well as local programmes regularly. This sector should be exploited for the ICT development for the communities.

5.3 Ownership of radio and television receivers

Number of households owning radio and TV sets in accordance with the Census of 2001 is given in the following Figure. About 51% of rural households owned radio and 16% TV receivers. Radio and TV ownership in mountain area is 53.91 and 4.52 whereas in Tarai the figures are 42.65 and 25.14 percent of households respectively. This shows that even radio ownership is low.

Figure 11: Ownership of TV & Radio Receivers

Area Covered	TV Only	Radio Only	/ & Radio both	Total Radio	Total TV
area / %of house holds					
Nepal	5.62	36.2	17.1	53.3	22.72
Urban	11.36	21.15	43.51	64.66	54.87
Rural	4.52	39.04	11.9	50.94	16.42
Mountain	0.52	49.91	4	53.91	4.52
Hills	3.25	45.6	19.34	64.94	22.59
Tarai	8.74	26.25	16.4	42.65	25.14

5.4 Policy and regulatory framework

5.4.1 Broadcasting policy

The Communication Policy of 1992 was the first policy document of the kind covering all the components of communications. It paved the way for introducing laws and regulations for private sector participation in broadcasting in democratic environment. With the objective of providing information and expanding broadcasting services through out the country, the long-term broadcasting policy as enunciated in the Long-term Communication Policy 2000 includes basically the following:

- to maintain a competitive environment for broadcasting,
- to establish a national broadcasting authority in order to regulate broadcasters,
- to enhance rural access to broadcasting through satellite,



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- to promote distance education through government owned broadcasting institutions as well as that of private sector,
- to establish some public service obligation to private sector broadcasters,
- to provide integrated information service through radio, television, internet and telephone in districts,
- to provide an autonomous broadcasting academy to build human resources for broadcasting and programmed development,
- to encourage development of programmes to enhance cultural heritage.

However, apart from issuing some licenses to new broadcasters as provided by the existing regulations no significant strides have been observed to implement this policy.

5.4.2 Radio law

Radio Act (1957) was designed to license for holding, making or using radio machines (equipment). The first amendment in 1989 introduced the definition of the radio machine. The requirement of having license was removed for NTA licensed operators and users of the service of licensed operators by the Amendment of the Act in 2000. It is learnt that this amendment has not been fully implemented in practice. NTA collects frequency fees on behalf of the government as required by the *Radio Communication (License) Regulation, 2049 (1992)*. The regulation has set up the procedures for licensing and charges for the use of frequencies.

5.4.3 Broadcasting Act

Broadcasting Act (1993), which followed the 1992 Communications Policy, had set the stage for breaking the hold of state owned monopoly of Radio Nepal and Nepal Television in broadcasting:

- It provides for licensing private sector in broadcasting television programmes by satellite, cable and by any other means and programmes by establishing FM broadcasting system (i.e. Radio or Television system).
- It also provides for establishing Earth Station for the purpose of broadcasting programmes through means of satellite or cable to reach consumers.
- The Act authorizes the government to frame necessary Rules in order to implement the objectives of this Act and to delegate any or all the powers conferred on it by the Act to any authority or body.
- It also stipulates the extent of penalty for broadcasting or causing to broadcast without license or any programme in contravention of this Act.
- It also guides that programmes should be directed to development of the country, preservation of culture and folklore, and maintenance of good relation with neighbours.



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- The Act describes duties and functions of the broadcasters, in particular their responsibility in maintaining political neutrality and verifiability of news. It forbids advertisement pertaining to health (smoking and drinking) and pornography and also detrimental to political parties, country's security and sovereignty.
- It also disallows advertisements with intent to overthrow elected government, detract from the non-aligned foreign policy of Nepal, or that in any way create division, hatred, insult and degradation of any community, language, religion or culture.

5.4.4 National Broadcasting Regulation

The regulation came two years after the Act. The regulation includes licensing procedures, annual licensing and royalty charges. The rules stipulate that the period of the license will be specified in the permission letter. A number of points seems to arise while going through the licensing Rules of the Regulation.

- The regulation seeks information from the applicant in the prescribed format but reserves the right to issue license or not to without specifying any criteria as to how an applicant is qualified or otherwise to obtain license.
- Rules do not provide for any limits to number of licenses to be issued and applicants are able to apply any time but Rules are not specific in terms of any period within which a license will be issued or application will be rejected showing reasons of rejection.
- Rules further specify that license period will be as mentioned in the license and the permission letter indicating that the period is subject to discretion of licensing authority.

We observe that:

- It certainly appears wise to go through the licensing Rules and see that Rules are specific and licensing regime is based on clear and transparent criteria and licensing procedure is expeditious which does not provide for any room for undue public criticism.
- It is further suggested that license free operation or with nominal charges for rural cable TV operators and Community owned radios broadcasts be considered. In cable TV operations community developed local TV programmes transmission could be made obligatory with some community participation.



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6 TELECOMMUNICATIONS SECTOR

6.1 Evolution of telecommunications sector

Box 3: Some milestones in Nepal's telecoms history

- Telecommunications Department was created in 1959.
- The first telephone exchange of 1000 lines of Nepal was installed in Kathmandu in 1963.
- Open wire carrier system as the first trunk telephone system was installed to connect India and Nepal in 1971 linking Indian border town of Raxaul with Birgunj, Hetauda, Palung and Kathmandu in Nepal.
- By 1975, for the first time, modern microwave radio trunk telephone facilities built under the first IDA Credit connected Kathmandu, Pokhara, Birgunj and towns in the eastern part of the country.
- India was linked by microwave radio by 1980.
- Second IDA credit was able to connect Western part of the country up to Nepalgunj by 1982.
- Satellite communications connected Nepal with the rest of world in 1982.
- The first digital exchange was commissioned in February 1984.
- A new era of direct dialling started inside the country in 1986 and with the rest of the world in 1987, which ushered in a sea change in the quality of service and set the stage for rapid growth in telecom revenue.
- By 1988, under Japanese assistance, 26 hilly districts leaped in to modern era of direct dialling.
- By 1990 the number of telephone lines grew to 75,000.
- Fifth IDA Credit and other donor assistances commenced in 1992 after a delay of 2 years due to plan holiday resulting from administrative and political adjustments on restoration of democracy. The fall in prices of equipment due to development in technology and competition between two digital switch suppliers, under this Credit, triggered the rapid growth in telephone lines by 1995.
- Enacting of Telecommunication Act in April 1997 gave birth to Nepal Telecommunication Authority, the regulatory body in 1998.
- Telecommunications Policy was formulated in 1999.
- VSAT links by private operators broke the incumbent's monopoly in international lease lines in 1997.
- First Private Operator United Telecom Ltd. commenced telephone service with Wireless in Local Loop technology in 2003.

The Telecommunications Department was created in 1959 by the first elected government of Nepal. By 1969, with the commencement of World Bank assistance, the Department was converted to Nepal Telecom Board under a Board of Directors. In 1975 the Board was again converted to a full-fledged self-accounting Corporation to operate telecommunication services under government ownership. It continued to operate as such until April 2004 when it became a Company to be able to work within a competitive environment.



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The general direction outlined in the Communications Policy 1992 and subsequent sector reform study and plan of action recommended by the study had paved the way for liberalisation of the sector. Government, as practised elsewhere, wished to introduce new operators in cellular mobile and also in telephone service through wireless in local loop. Invitations for proposals were made in 1994.

Major international operators took part in the invitation. Successful technical offers were declared and financial offers were to be opened. However, litigation against government's efforts caused suspension of further action. The court took over 2 years to give its verdict against government action and proposals had to be cancelled. In the mean time, government was in the process of bringing out a new Telecommunications Act to create an independent regulator and licensing regime.

Government took the view that instead of going through inviting new proposals under the old telecommunication law it would be better to go for new proposals after the regulatory body is in place under the new telecom law. However, delays occurred in enacting the new telecom law. Subsequent delays in putting the regulatory body in place and the political instability had slowed down the renewed attempts to liberalise telecom sector.

New proposals could only be invited in the year 2000. A reasonable competition was seen for mobile licensing. However, due to lack of provisions to achieve speedy conclusions in the bidding process, the mobile license was issued after a lapse of nearly four years in September 2004 to Spice Nepal, the selected bidder after a protracted discussion. The operator is yet to commence its service. There was virtually no competition in wireless in local loop and rural telecom related bids. UTL, the wireless in local loop operator, could also commence service in the year 2003 only and is currently providing service in Kathmandu Valley only. UTL wants to include Pokhara, Bhairahawa, Butwal, Bharatpur, Birgunj, Banepa in their network by 2005 and Biratnagar, Dharan, Itahari, Biratmode, Hetauda and Nepalgunj by 2006.

The selected rural telecom bidder refused to work because of the prevailing unrest in the country. After re-bidding carried out in 2002 STM was selected as the rural telecom operator for the Eastern Development Region. The company is now installing the equipment, and part of its network is providing service in tarai area.

To summarise the situation in major services, currently we have 4 operators licensed to provide services. These are Nepal Telecom, the incumbent, United Telecom Limited (UTL) the wireless in local loop operator, STM Communications Ltd in rural telecom service for the eastern development region and Spice Nepal, the new cellular mobile operator, who has yet to commence service.

Figure 12 shows the growth in fixed lines achieved by Nepal Telecom during the past decade and Figure 13 shows the rapid take-up of mobile connections during the last 5 years, especially the last year since the start of pre-paid service.



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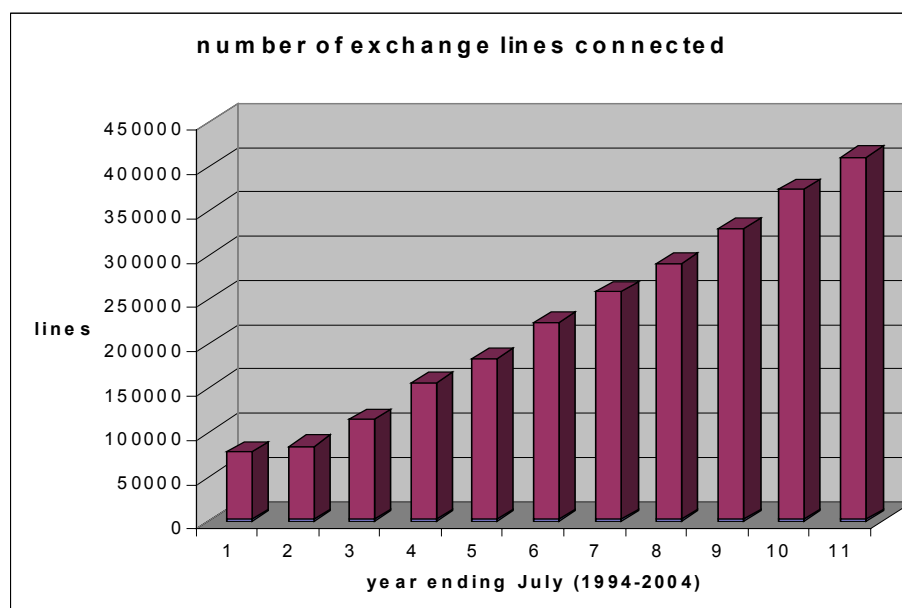
Nepal Telecom is the only operator who provides a full range of services and covers the entire country. UTL currently serves only Kathmandu Valley. STM with its VSAT strategy has limitation to provide cheaper access both in terms of voice and data in the Eastern Development Region. The current technology being deployed by STM will provide data rate of less than 8kbps in each dial-up connection they could provide.

Fibre through NEA's power grid (OPGW) connects Kathmandu with Pokhara and East-West Fibre backbone. If NEA expands its fibre reach throughout the country via its East-West grid as well as its North-South grid connections, it could provide an alternative backbone which would strongly compete with Nepal Telecom and could spur the growth of telecommunications. Small efficient local operators could have space in rural and small towns with wireless connectivity to provide both voice and data, maybe through IP networks.

In 1999 NTA opened Minor Services for licensing by Gazette notification as stipulated under section 23 subsection (2) of the Act. Operators under this provision are allowed to apply at any time for a license. To date 26 licenses have been issued to Internet service, 8 to radio paging, 10 to VSAT service providers and 6 to fax mail service providers. Two Licenses for GMPCS were issued during the year 2003/2004.

Telecom tariffs are formally approved by NTA, but NTA does not really intervene in tariff determinations. While tariff regulation may not be needed once a market becomes competitive (as for Internet services), regulation of prices and quality is definitely necessary for monopoly services, whether of Nepal Telecom or any other operator, such as a major cable operator's cable modem service. Some information on current tariffs is provided in Annex 4.

Figure 12: Growth during the last decade in fixed lines



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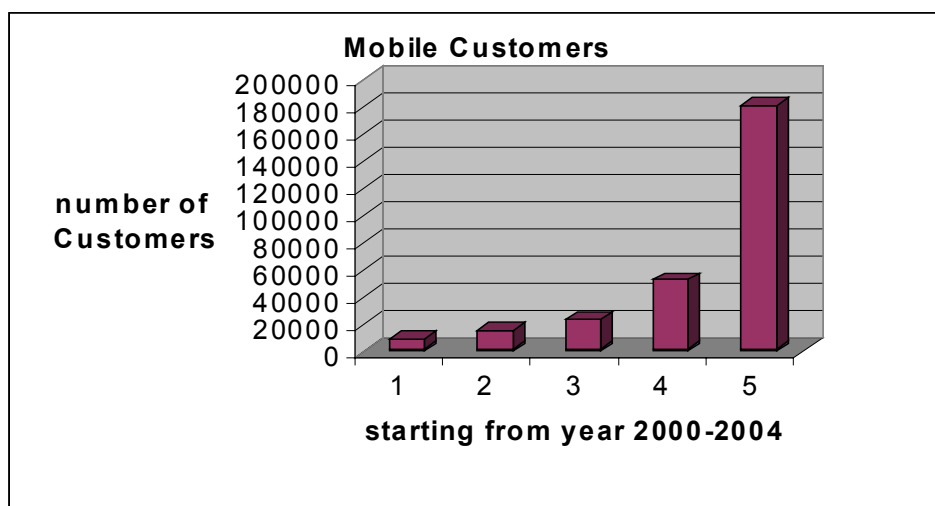
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Figure 13: Growth during the last 5 years in mobile connections

6.2 Present and planned status of telecom facilities

6.2.1 International telecom facilities

Currently Nepal is connected to India with fibre optic links. Nepal is connected with the rest of the world via satellite. Nepal Telecom has Standard A, and B Earth Stations. UTL is also connected by satellite link for its international operations. Many ISPs and communication service providers are connected through several VSAT earth stations.

6.2.2 Trunk backbone and spur routes

Communications and the power grid more or less follow the East-West highway and the several North-South main roads. In similar fashion, telecoms trunk backbone routes (to date provided only by Nepal Telecom) run East-West, and several backbone routes run South to North. Basically Nepal's main telecommunication network until very recently was dependent on microwave radio systems. The capacity varies from a couple of 140 Mbit/s routes in the backbone route down to 2 Mbit/s terminations in some small exchange locations. Recently fibre optic backbone cable was laid from the Eastern border of Nepal to Lamahi in the Midwestern Development Region along the highway. This link is expected to be extended up to the Western border of Nepal within the next 18 months.

Optical fibre: The East-West Fibre Link laid underground along the East-West Highway has 24 fibres with at most 8 fibres currently in use, with maximum installed system capacity of STM-16. Kathmandu is connected to this backbone with OPGW (Over Power Ground Wire) fibre link of Nepal Electricity Authority (NEA). NEA has now Hetauda-Kathmandu and Butwal-Kaligandaki-Pokhara-Marsyangdi-Kathmandu OPGW fibre links operational. NEA is soon going to install Kathmandu-Khimti-Sundhuli-Bardibas (near Janakpur) OPGW fibre link which will be connected to East-West Fibre link. NEA is considering Nepal Telecom's



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request to provide fibre optic link through OPGW in their North-South sections of the power grid. These fibre optic links if constructed will form the basic backbones for expanding cellular mobile and fixed wireless access to rural settlements in the hilly part of Nepal.

Microwave radio relay systems will always play an important role in the telecommunication infrastructure for the type of the terrain and topography Nepal has. The fibre optic cable will emerge as a big contender for carrying volume traffic but microwave will always provide additional reliability during floods which can damage fibre cables. Nepal Telecom is currently replacing and enhancing the capacity of the aging system East of Kathmandu. Main backbone routes will have SDH radio links of 2+1 configuration. 100 hops of microwave radio links of 8-34 Mbits/s are to be installed for spur links going to district headquarters and some smaller towns in low lands. 40% of these hops are for replacement of old radio links and other 60% are for new installations. All these works will be completed by July 2006. Replacement of existing backbone microwave radio relay systems West of Kathmandu with SDH radio links being considered currently is expected to be completed by 2007.

Regional satellite links providing 150 voice circuits each between Kathmandu, and regional towns Nepalgunj, Bhairahawa, and Pokhara still exist. These were designed earlier to provide minimum service during emergencies arising from failures in backbone radio links which are now further secured by fibre links. A 120 voice circuit link between Kathmandu and Dhangadhi is also being planned to be installed along with district satellite communications.

District satellite links providing 60 low bit rate (8 kbps) coded voice with digital speech interpolation circuits and other required bearers for connecting over 300 CDMA subscribers in each of the 30 primarily remote and difficult districts is being planned where existing microwave radio links are not operational due to conflict. The plan includes for 2 Mbps DVB down link and 64 kbps up link for Internet services per district terminal. According to the planning engineers of Nepal Telecom, the services from these links are to commence before July 2006.

6.2.3 NT's fixed and rural telephone facilities

As of mid-July 2004, coverage of Nepal Telecom's public switched telephone network (PSTN) has been provided through 187 telephone exchanges installed in 181 locations of 69 districts of the country. The total installed capacity is 482,000 exchange lines of which 412,000 are connected for service. The majority of these lines serve Kathmandu Valley.

Nepal Telecom does not publish any statistics as to the number of rural customers served by fixed lines, however, it is estimated that the average penetration of fixed lines *for the whole country is 1.65 lines per hundred persons whereas for rural it is only 1.2 lines per thousand persons*. This shows how inadequate the service is in the rural areas at the moment.

There were no new rural telecom programme during the second half of 1990s, due both to political instability, and absence of assurance for further external investment beyond the fifth phase of the investment programme arising from anticipated changes in Nepal Telecom's status and regulatory environment.



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According to Nepal Telecom's figures, the number of VDCs currently served with telephone is 1959. Rural areas obtain telephone service through direct exchange lines in locations adjoining towns and also in rural areas where small exchanges are installed. Many rural areas where exchanges do not exist, telephone service is extended by the radio relay system of Multi-Access Radio Telephone Technology (MARTS). According to Nepal Telecom's July 2004 figures there are 539 terminals and 92 repeaters of MARTS, 186 VSAT terminals, and a number of VHF single or two channel telephones. However, many of these systems are not operational due to the prevailing conflict. However, Nepal Telecom's records are not updated accordingly. A majority of the 3957 connections provided through MARTS (2749), VSAT (174) and VHF (1034) are affected.

Nepal Telecom has been installing rural telecom facilities of VSAT technology and WLL for rural areas for the last couple of years, but these projects are facing problems due to prevailing conflict and also problems in equipment designs. The VSAT contract was supposed to have provided at least two lines in over 1000 sites and several lines in some 100 places. The purpose was to provide communications in remote VDCs as well as the areas where terrestrial wireless may have difficulty in coverage due to mountain folds. So far only 186 VSAT terminals have come in to operation. Several of these are installed in district head quarters where previous microwave links were either destroyed or they never got installed because of the conflict. The other programme WLL (Corduct), which was being piloted in Western Development Region, has suffered due to some equipment deficiencies.

CDMA technology basically to cater for rural need is being purchased by Nepal Telecom. Negotiation for a contract of a CDMA system for 1 million subscribers, and aimed at providing 500,000 subscriber connections by July 2007, has been recently carried out. The new system will virtually cover the whole country through three networks with three switching centres located in Kathmandu (Network I), Bhairahawa (Network II) and Biratnagar (Network III) for the Central, the Eastern and the Western parts of the country respectively. Network II and Network III will have 150,000 subscribers each whereas Network I will have 200,000 subscribers by July 2007. These networks together are proposed to be extended by 500,000 subscribers in the subsequent five years.

6.2.4 STM Communications Ltd's rural telecom facilities

STM Communications Ltd., the major rural operator for the Eastern Development Region, has initiated service in 107 locations, mainly in Tarai area of the Eastern Development Region, and is currently installing equipment in the hilly VDCs of the region to cover the rest of 1068 locations in 534 VDCs through its VSAT system. Due to higher tariffs of STM compared to Nepal Telecom, the service of STM is not being welcomed by people particularly in those locations where Nepal Telecom seem to have parallel facilities running.

6.2.5 Mobile services and coverage

Nepal Telecom has been providing cellular mobile phone service since 1999. According to July 2004 figures capacity of post-paid subscribers is 90,000 and 70,360 connections have been provided, whereas the capacity of 120,000 prepaid subscribers has been already exhausted. Recently about 58,000 additional prepaid customers were added to the network in 2 days after which sales were ceased due to lack of capacity.



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At present, mobile service is available in Kathmandu valley, Banepa, Dhulikhel, Birgunj, Parwanipur, Simra, Hetauda and Bharatpur, Janakpur, Rajbiraj, Siraha Biratnagar, Dharan, Inerwa, Damak, Bhadrapur, Ilam, Pokhara valley, Bhairahawa, Butwal, Lumbini, Nepalgunj, Kohalpur, Dhangadhi, Mahendranagar, and Attarya. The coverage area is going to be expanded in the near future along the highways and adjoining towns from Kathmandu to Bhadrapur in the east and main towns and cities in the west. The ongoing project is expected to be completed within the fiscal year 2060/61. Some additions in capacity are expected by November.

A tender for supply of GSM equipment for 1 million additional connections has closed toward the end of October. Installations will be implemented in 2 phases. The first phase aims at adding a total of 750,000 new connections of which 150,000 are for post-paid while 600,000 are for prepaid. Once the bidder is selected, within 18 months the first phase work will be complete. The second phase of 250,000 connections, while not included in the roll out schedule, will be scheduled later as required by the demand of service. The sudden jump in demand is due to the introduction of prepaid system in the cellular market.

Spice Nepal licensed to operate mobile service in the month of September, 2004 has a roll out plan to commence service in Kathmandu Valley within 9 months of license and to add 4/5 major towns in 3 years.

6.2.6 Data and Voice Mail Facilities

On enquiry with high officials of Nepal Telecom, they confirmed that they are planning to provide ADSL (n x 64 kbps – 2 mbps) links, and WiFi-Wireless in number of towns; details of plan as to its extent and timing of implementation of both will be finalized within January 2005. For Kathmandu Valley, Nepal Telecom is installing about 650 terminations of (n x 64 kbps-2 mbps) data link through their fibre optics in Kathmandu Valley, which is due for commissioning by January 2005. Indeed all of these are positive developments in data network and Internet, but again pricing by Nepal Telecom and appropriate regulation of lease by NTA will determine their use and usefulness to users. They further added that plan to introduce 200,000-voice mail facility by 2005 is being implemented.

6.3 Telecom policy and regulatory framework

6.3.1 Initiation of sector reform

The Ministry of Information and Communications has jurisdiction over policies and functions related to all the sectors of communications. The Communication Policy of 1992 gave the general direction for the liberalisation of the telecom sector.

A Sector Reform study carried out in 1992 laid down a plan of action for liberalisation of the telecom sector, phased privatization of Nepal Telecom and separation of ownership, policy and regulation. The study suggested that Nepal Telecom be put under some other Ministry like Ministry of Finance while policy and regulatory responsibility remained within the MOIC initially. It was determined that phased privatisation of the incumbent operator would



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be necessary in order to free it gradually from government control in the face of impending competition from professionally managed new operators under the liberalised sector environment.

Earlier efforts of sector liberalisation as discussed earlier in 6.1 were stymied. Separation of policy and operations as recommended in the sector study did not take place. Privatisation of the incumbent, recommended in the sector reform study, could not take off either. The incumbent was only recently, in April 2004, converted to a Company from its earlier Corporation status. The new Telecommunication Act which followed several years later, indeed, created an independent telecom regulatory body. In fact section 6.1 shows that regulatory development has been slow and not at all smooth and is still facing problems in implementation of the Telecommunication Policy 2004 adopted by the government about 7 months back.

6.3.2 Telecommunication Act 1997

The Telecommunication Act was promulgated in April 1997 (please refer to Annex-5 for prevailing and proposed laws related to IT). The Act provided for the Nepal Telecommunication Authority (NTA) to regulate the telecom sector. This was established in 1998.

It created a licensing regime for participation of the private sector in provision of telecommunication services. The Act intended that the number of operators required in major services be determined by NTA. It should publish notices inviting applications for licenses and not allow any additional operator in the five years following issue of a license, with a proviso that NTA should still be in a position to issue additional licenses in case of failure of the previous licensee to provide service or if NTA determines that such additional license is required after evaluation of the situation before the end of the five year period. The position of new licensees really obtaining licenses several years after an invitation to apply for licenses remains to be clarified in this regard. This could produce undue harm to the sector development.

The Act made two provisions for development of rural areas (for the purpose of universal access). One authorised the government to prescribe that a certain percentage of the total investment of major operators should be for the purpose of providing service in rural areas, and the other authorised NTA to create a Fund by collecting specific amounts annually from the income of operators for developing rural telecommunications services.

The Telecom Act 1997 created a Frequency Determination Committee headed by the Minister of Communications, and the frequency management function was passed on to NTA. The Ministry of Information and Communications (MOIC) has radio licensing functions under the Radio law. The frequency management function still remains within the Ministry. In this respect the Act is currently being interpreted as NTA being responsible for management of frequencies allocated (by the radio frequency determination committee) for providing telecommunication services, while the remainder of frequency management function remains within the Ministry.



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The Act made provisions for interconnection of networks operated by different service providers. It also made provision for redressal of complaints and penalties for non-compliance.

6.3.3 Telecommunication Regulations 1997

The Telecommunications Regulations came out in November 1997. Three amendments of regulations followed - one in 1999 and two in 2002. The regulations include detailed provisions relating to qualifications of chairman and members of NTA, detailed licensing procedures including specifying eligibility conditions for license application for operators of various kinds, and renewal, amendment and transfer of licenses, terms to be observed by licensee, inspection, report and implementation, disputes relating to telecommunications and settlement thereof.

6.3.4 Telecom Policy 1999 and 2004

A specific policy for the telecom sector was adopted by the government for the first time in 1999. It expressed the strong desire to liberalise the sector and stated that services would be opened to several operators by 2004. The new Telecommunications Policy 2004 adopted in March 2004 has redefined the intent of the 1999 policy of further liberalisation. The new telecom policy 2004:

- Intends to introduce an open licensing regime with no limits on the number of operators, except where this is dictated by scarce spectrum.
- Intends to simplify the licensing process for services using scarce spectrum by basing it on the principle of coverage of the rural area rather than who pays highest amount of fees and royalties.
- Intends to set a simple principle of determining license fees.
- Clarifies universal access as providing telephones to everybody at no more than “shouting distance” i.e. the called person can be asked to come over and answer the call as the call is being held.
- Further specifies the principles on interconnection, obligation of dominant operator and management of anticompetitive practices and behaviours to establish a competitive and liberalised sector structure for the benefit of citizens.
- Intends to encourage the private sector to participate in service provision.
- Intends the telecom sector to bear normal taxation as the rest of industry, by gradually offloading the charges and fees, to allow it to develop in order to further contribute in the economic development of the country.
- Emphasises a number of steps to be taken to promote application of ICT in the country.



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6.3.5 Implementation of Telecom Policy 2004

The telecom policy was approved by the government in March 2004. In the process of implementing policy it was thought that amendment of the Telecom Act 1997 and Telecom Regulation should be done first. However, it seems to have taken a considerable length of time to get the process started and the recommended amendment to the Act has only recently been forwarded to the Ministry of Law and Justice.

Due to uncertainties as to when the amendment will materialise, it appears wise that existing provisions of the Act be utilized as far as possible to implement the policy. Unless this course is taken, the delay experienced in the change to desired sector structure will continue to plague the Nepalese telecom sector and extending interconnection privileges envisaged in the Telecom Policy 2004 to foster liberalisation of the sector particularly in provision of connectivity to offer Internet and Voice on IP to rural users by other operators including small local ones other than incumbent operator is not going to be possible at all. Section 23 subsection (2) of the Act permits Government to call applications for license through a Gazette notification specifying all the rules and procedures in the notification itself. In order to implement Telecom Policy 2004, all services requiring a standard license can be brought under this subsection.

The Telecom Regulation (1997) can be amended through Cabinet decision, if this is necessary for consistency with these proposed changes. Changes to items specified under individual licenses can be also be executed before the Act is amended by the same type of Gazette Notification. License fees can also be set according to the new Policy by amending the regulations. Changing regulations is a far simpler process than amending the Act. Therefore, these steps should be taken immediately, to prepare for implementation of infrastructure provisions for ICT projects by smaller and more resilient operators in peri-urban and rural areas.

6.4 Bottlenecks for rural Internet provision

In summary, rural telecom service is being provided through direct exchange lines of rural switches such as the C-DOT type, RLUs (remote line units) of bigger digital switches, exchange lines extended by MARTS or through VSAT terminals, cellular GSM system, and CDMA system. Nepal Telecom is planning to serve a large part of the country with CDMA. The following technical problems exist in the rural telecom network for providing Internet service:

- The VSAT system provided by Nepal Telecom and STM has voice based systems and uses a low rate codec. As such they provide data at very low rates (below 8 kbps), which is inadequate for functional Internet access.
- The rural exchange of C-DOT type is not able to provide Internet connections.
- The dial-up traffic from other exchanges goes at a reasonable data rate, provided they are not truncated by again low rate coding in long distance circuits, which Nepal Telecom uses in some of the rural paths where they have ran out of capacity on digital radio links.
- Present CDMA and GSM equipment also has speed limitations on their codecs and as such cannot be used beyond 8 kbps.



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So only rural dial-ups which are connected to direct exchange lines of RLUs or digital exchanges other than C-DOT type can attain reasonable speeds. Even for these lines it is necessary that they are not truncated by codecs placed on their long distance paths while using for internet connections. *Unless some separate bandwidth is provided with better arrangements, all systems in rural areas are going to suffer from this deficiency.*

However, Nepal Telecom says that 55 district head quarters have do not have limitations as they are not connected to C-DOT type rural digital switch. At the same time Nepal Telecom is providing 30 difficult district headquarters with 2 Mbps DVB mode of satellite down link for data at each district head quarters with the purpose of providing Internet connections. Therefore most district headquarters will have good internet down link capability. Going down beyond DHQs, it seems that the problem persists unless some other arrangement is made to remove it. Nepal Telecom can also introduce EVD (a data specific transceiver) in CDMA base stations at about 50% additional transceiver cost, which can provide data rates up to 2Mbps in its coverage area.

Within a district, a network for data can be built on WiFi-like technology, or WiMAX, which is going to come in the market soon. WiFi has the advantage of being a WLAN 802.11 b/g/a standard, is very popular, and is finding widespread use with a fairly large number of suppliers. WiFi is the technology which uses ISM (Industrial Scientific and Manufacturing) bands which are license-free in many countries. In Nepal it is used in much longer hops to get coverage of wireless customers which are much more widely dispersed even in places like the capital city. These bands are not yet made license-free in Nepal. These bands could easily be left license free particularly in peri-urban and rural applications. WiMAX is a new technology standard 802.16 which is due to appear this year and is touted to be really advantageous for rural coverage. Once they are deployed in large numbers prices will fall. However, *the regulatory arrangements for co-location of private sector equipment and antennas with that of incumbent operator could greatly enhance the capability of small private operators to provide IP connections in rural areas.*

6.5 Internet services and market

6.5.1 Internet services growth in Nepal

Dial-up email service via UUCP started in 1994. In 1995, Mercantile Communications began Internet service in Nepal, followed by Worldlink and ComputerLand in 1996. Legal status was attained by these operators after the Telecom Act 1997. Nepal Telecom held the monopoly in providing international data links until 1999 when VSAT providers were allowed to provide international data connectivity. With the removal of Nepal Telecom's monopoly, international leased line costs fell steeply, facilitating Internet growth.

The cost of Internet service depends on three items:

- International bandwidth cost
- Access cost
- ISPs charges



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The steep fall in international connectivity prices gave birth to several small ISPs generating substantial competition in Internet service. By January 2000 there were 9 ISPs operational. This number has grown to 26 ISP licensees by July 2004. NTA, however, does not provide figures as to how many licensees are really operating. The number of Internet accounts in 2004 is estimated at about *50 thousand which grew from a figure of 9 thousand in 2000*⁷. Based on the figure of accounts, the number of users is estimated at 200 thousand. International bandwidth for Internet connection in total is estimated at about 45 mbps.

6.5.2 Internet growth outside Kathmandu Valley

The rapid growth of Internet use outlined above has been largely confined to the Kathmandu Valley. Elsewhere, in sharp contrast, growth has been slow. The reasons for this are a mixture of commercial, technical and regulatory factors. Despite positive policies, ISPs suffer from many road blocks offered by the incumbent operator: inadequate leased circuits, high leased circuit prices and monopoly behaviour.

Smaller towns usually offer less attractive markets. Despite this, the private sector now has Points of Presence (POPs) in Biratnagar, Jhapa, Dharan, Janakpur, Birgunj, Hetauda, Damauli, Pokhara, Bharatpur, Bhairahawa, Butwal, Nepalgunj and Dhangarhi.

A major factor limiting Internet demand outside these centres is high access cost. In most of the country, end users have to pay for a long distance phone call to access the Internet. Only in the second half of 2004 has Nepal Telecom been able to establish dial-up access at a local fee in 55 district headquarters through their POPs or virtual POPs. And this facility is only available to the customers of Nepal Telecom's own ISP, which has proven to be slow in responding to customers' needs. This has been manifested by their small customer base in the Kathmandu Valley despite all the facilities that are available to this ISP from Nepal Telecom in contrast with the treatment other ISPs receive from the incumbent operator. Therefore, it is expected that the customer service will be of much lower grade in the rural areas (or district level) in absence of competition offered by private ISPs due to their much higher connectivity costs in comparison with that of Nepal Telecom's POPs. *This situation is likely to persist unless some regulatory prescription or competition in provision of network facilities is brought about to alleviate high connectivity cost problems of ISPs.* A private sector ISP wanting to establish a new POP in districts or outside of Kathmandu encounters many difficulties. These are mainly:

- Long distance leased lines are not readily available and quality of service is poor.
- Leased line costs are high and are not currently regulated by NTA.
- Backhaul costs for international links are also high compared with Kathmandu because of loss of economies of scale, with fewer customers and lower bandwidth use.
- A limited customer base within reach of any new POP, because of the lack of rural access lines, and technical limitations of the existing and planned rural access network. As discussed in 6.4, generally at most low data speeds are possible, and there may be no data capability at all.

⁷ There are no formal statistics as to accounts, but this estimate was given during a meeting with the ISPs.



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- Regulatory inconveniences while obtaining services from regulatory functionaries.
- ISPs also have to bear full regulatory fees, universal access obligation and Royalty charges.

6.5.3 Nepal Internet Exchange and IP backbone

Nepal Internet Exchange (NPIX) was established in 2002. NPIX at present carries traffic of only about 2 Mbps. The goals of NPIX are:

- faster exchange of data between users of local ISPs.
- saving money on expensive international bandwidth for traffic originated and terminated within Nepal.
- to propagate new services through NPIX like web hosting, telephony, e-commerce and portals.

Currently several ISPs including World link, MOS and Vianet are peering in NPIX. More than half the ISPs have yet to connect to this exchange. The main reason for this is the unavailability of lease lines required for accessing the exchange. *For successful implementation of the NPIX Nepal Telecom must offer cheaper (cost based) high speed access to the exchange from the service providers' POPs. It will be difficult to think of cheaper service and growth of Internet and applications in the country where Internet Exchange facilities do not exist.*

To expand further and take the NPIX national, regional POPs of ISPs need to connect with each other. For example ISPs in Pokhara should connect to a regional exchange in Pokhara and the Pokhara exchange would be connected to the Kathmandu exchange. High speed links would be necessary to connect these regional exchanges with NPIX. The recently commissioned East-West fibre link and other similar links could be utilized for this purpose. However, the Regulator will have to be aware the pricing of leased lines. Thus, to establish national backbones for IP, the following needs to be done:

- Establish a number of regional Internet exchanges where routing and peering between different IP service providers takes place.
- Provide high speed links as necessary to connect these regional exchanges at regulated prices until there is no competition in the network facilities.
- Incumbent should be made to readily provide leased lines to connect service providers' POPs to these exchanges.

6.5.4 Cost factors for users and necessary regulatory oversight

Even after cheaper bandwidth prices resulting from deregulation of international data links, the bandwidth component still constitutes about 40% of what ISPs collect from the user, due to Nepal's dependence on satellite media in this regard. But the largest cost component for the average user is telephone usage for dial-up connection. This can be roughly estimated as 40% of what a user pays altogether to the ISP and for telephone use. This brings out the fact that although a user uses his telephone for much longer periods for Internet service than for normal voice calls, he still does not enjoy cheaper rates for long use and is charged at the rate of a normal telephone call.



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To encourage growth in Internet use, Nepal needs to follow the example of many other countries and provide discounted and flat rates for Internet dial-up service. But in the absence of competition in dial-up service for Internet⁸, *Internet users are not likely to obtain cheaper access without regulatory intervention.*

Similarly in absence of regulation of DSL service, Nepal Telecom is likely to use its monopoly strength to charge whatever they want if they do provide DSL modems. Cable operators have been permitted to provide cable modem service, but as they too are trying to be ISPs, they too are likely to use their monopoly powers to move Internet users to their fold by bundling Internet and television charges together. It may be wise for NTA to require unbundling of both DSL provision and cable modem provision.

6.5.5 Cyber cafes

There has been a significant upsurge in the number of privately owned internet kiosks (popularly known as *cyber cafes*) in several urban areas of Nepal where basic enabling infrastructure exists. It is estimated that the number of cyber cafes may exceed 1000, according to executive members of the Internet Service Providers Association of Nepal. These provide Internet and email services and also other communications and telephone calling facilities. Cyber cafes are an important means for accessing the Internet, particularly for the younger generation who do not have access in their homes. These *cyber cafes or kiosks* are playing a crucial role in diffusing ICTs to a large number of people, even though they are completely commercially oriented. Chat seems to be the most popular method of communicating between youngsters.

A forthcoming report on the future of NepalNet subject by ODC (commissioned by IDRC) contains some new information on Internet availability and usage in Nepal, based on interviews carried out in mid-2004 with over 1,000 individual users of cyber cafes in nine main cities of Nepal.

Cyber cafe users were predominantly young and well-educated: their average age was 22 years, and more than 90% had at least Higher Secondary education. 70% of interviewees described themselves as students. (This pattern is consistent with the findings of similar research in many other countries – everywhere, older people are much less interested in the Internet even where they have no financial barrier to use). The most popular use of Internet search was entertainment (33%), closely followed by news and research. The most used Nepali website by far was nepalnews.com (48%).

⁸ UTL's dial-up WLL service, while directly Internet-compatible (not requiring a modem) has the inherently lower speed of 14.4 kbps.



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7 RURAL ICT INTERVENTIONS

7.1 Lessons from Nepal's own experience with rural ICTs

This study includes a separate International Review which aims to present the most relevant learning that is now available from international experience. But nothing can be more relevant to Nepal than its own experience, of which there is now a useful body available.

The body of this chapter outlines a range of recent initiatives relating to ICTs in rural Nepal. Here we try to draw out some of the main learning points from these and other experience.

Demand for telephone service is well-established. Long queues for prepaid SIM cards illustrate what has been found by surveys⁹ - there is a strong unmet demand for telephone service, in rural as well as urban areas.

Radio broadcasts are an effective way to reach mass audiences. By now around three-quarters of Nepalese households possess a radio. Although these may be most used for entertainment, well-produced developmental programmes (such as those on health and agriculture) are popular, and active participation (for example through Listeners' Clubs) is widespread.

Community radio is a proven ICT model. Nepal already has several active, self-sustaining community radio stations. These doubly benefit their communities by enabling them to produce as well as receive content. The nature of the medium ensures that content is appropriate to its audience.

Young people take naturally to computers. As in other countries, use of computers (and, where available and affordable, the Internet) is primarily by young people and especially by students. The importance of computing skills in the jobs market is well understood and computer courses are popular. Where they exist, computers in high schools are well used and appreciated by both students and teachers.

Internet use is too expensive for most people. Even a typical urban cyber café charge of 30 NR an hour, though low by international standards, puts regular or extensive Internet use out of reach of most Nepalis. In rural areas, long-distance dial-up charges may be imposed of 5 NR a minute or more. This is prohibitive for almost everyone. Other expenditure on providing Internet access is wasted until these charges come down.

Slow Internet connections are counter-productive. Some existing telecentres are providing slow data connections using technology designed for voice. Slow connections are not only expensive (as it can take a long time even to send and receive a little email), but they are unsuitable for web browsing and give a misleading impression of what the Internet can do.

⁹ Such as the recent SECEN/APT survey – see xxx.



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Reliable power supply is essential for both computers and communications. Much of the value of an ICT installation is lost if the facilities are only available unpredictably, depending on an erratic power supply.

Building successful community telecentres takes time and needs continuing support. Community appropriation of new technology is an organic process which, like growth of a tree, cannot be rushed. If outside support is withdrawn before the community is ready, the whole process may fail.

7.2 Experience with rural and peri-urban telecentres

In recent years there have been several initiatives to establish telecentres in Nepal, including:

- In August 2002 ICTs for Development - NEP-02-008- a joint initiative of Ministry of Science and Technology and UNDP was launched. Some of the 8 telecentres installed under this project included VSAT/Wi-Fi technology for access.
- The Development Information and Rural Access Project (NEP/03/M04), which in essence was a 'sub-project' operating under ICTs for Development supported by UNDP/TTF. Nuwakot and Okhaldhunga districts were piloted under this project again using VSAT connectivity¹⁰.
- The High Level Commission on IT (HLCIT) has also established 4 telecentres in different areas of the country.
- The UNDP supported and UN-Habitat executed study on Assessing feasibility of ICTs as an instrument of development in Nepal (SP-NEP/02/002) also included a piloting component entailing establishment of 8 telecentres in municipalities and Rural Market Centres where Rural-Urban Partnership Programme (RUPP-NEP/02/002) were being implemented.

Figure 14 and Figure 15 summarise the current status of most of these telecentres. It is learnt from officials and from our own visits and observations that only some of these telecentres are running satisfactorily and providing reasonable service. This is due to over staffing, insufficient support from the centre and several other factors. A number of centres have already reduced staffing to one from three. In Mustang all the telecentres have been running and seem to be doing fine. Mustang is also a place of tourist interest.

A detailed account of experiences on establishing telecentres is given in Annex 6¹¹ and a summary of important lessons learned is given below. On the positive side, there is a great deal of enthusiasm to support and promote telecentres at the community level. But three sets of lessons must be absorbed if future telecentres are to succeed:

¹⁰ NEP/03/M04 also developed a framework of Development Support Information System as part of creating a digital repository of documents, reports, research studies and reference materials relating to poverty reduction and sustainable development in Nepal.

¹¹ *Taking stock of telecentre movement in Nepal* by Manohar K Bhattarai.



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- Fulfilment of certain basic preconditions, without which a telecentre is doomed to fail.
- Community involvement, which is the essential foundation for local support and use of a telecentre.
- Central support, providing services needed by all telecentres, such as relevant content.

7.2.1 Basic preconditions

Experience so far shows that for telecentres to succeed, certain preconditions must be met. It is essential to meet these preconditions before starting any new telecentres.

- **Initial support:** telecentres require handholding support for at least a period of 1.5 years during which efforts should be mounted towards bringing them to a level of maturity where the participating communities are gradually prepared to fully own and sustain the initiatives. This should be supported by a well thought out phased exit strategy with embedded mechanism for building capacity of participating community so as to ensure smooth operation and sustainability of telecentres after the withdrawal of external support. A detailed plan of action with well articulated objectives, activities, milestones as well as monitoring and evaluation mechanisms must be developed and pursued during this period. Efforts must be undertaken to develop resources (manuals, guidelines etc) to support sustainability of telecentres beyond the period of intensive support.
- **Security:** overall security situation must improve in order to ensure success of any initiatives aimed at expanding rural connectivity. It must however be noted that telecentres have not been directly targeted so far by the insurgents. The locking-up of some VDCs where some telecentres were located by insurgents has forced the closure of some telecentres. There is also a case of security forces removing telecom connectivity to a telecentre located in Parbat districts fearing use of the same by insurgents.
- **Wireless connectivity:** over dependence on landline based dial-up connectivity for telecentre rollout excludes many potential areas where telecentres could generate real value to the communities. Therefore there must be freedom to use the most appropriate wireless connectivity solutions, and must be accompanied by a sound business model involving the establishment of multiple nodes covering sizable user base so as to ensure sustainability of such implementation
- **Cost of calls to Internet:** conducive policy provisions must be in place to bring down the connectivity charges to an affordable limit (for example, treating all calls made to ISP's by telecentres as local calls, tax breaks and like to rural ISPs). Affordable connectivity may best be brought about through policy provisions to foster proliferation of ISPs outside key urban areas.



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7.2.2 Community involvement

Experience so far shows that the following approach at the local level, based on active involvement of the whole community, is most likely to succeed:

- **Info-mobilisation:** The establishment of telecentres must accompany regular info-mobilization initiatives whereby participating communities are mobilized to exploit ICTs to meet local development needs.
- **Inclusiveness:** all strata of the society must be represented in telecentre users committee. This requires proactive responses on behalf of all concerned so as to influence the composition of such users committees. There has been low level of participation of women and dalits in telecentre users committees formed so far.
- **Early users:** apart from local beneficiaries and community members, local level development workers, government extension workers, teachers and NGO's could also be target beneficiaries of the telecentre. School children also stand to benefit substantially from access to telecentre resources.
- **Local enterprise:** opportunities exist at the local level to workout public-private partnership arrangements for the establishment and operation of telecentres

7.2.3 Central support

Central support will also play a vital part in creating successful telecentres:

- **content production:** the rollout of telecentres should be accompanied by judiciously designed development and business models that create digital opportunities involving development and deployment of content, services and solutions that cater to local needs and requirements
- **off-line applications:** implementations that sought to capitalize on interactivity attributes of ICTs (for example internet and email) faced challenges at most of the rural and per-urban areas due to poor quality of communication infrastructure resulting in painfully slow connections, absence of local ISP's resulting in increased connectivity costs and lack of technical backstopping support. Strategies must also therefore be in place for exploiting resourcefulness of ICTs when off-line.
- **properly resourced co-ordination:** a central level institutional mechanism with clear mandate and mission to coordinate, facilitate and support telecentre related initiatives undertaken by various agencies must be formed. Such an outfit would be desirable from the perspective of forging alliances among various actors engaged in bridging digital divide in the country. As development of properly aligned digital content falls under domain of various line agencies (for example health, education and agriculture extension, etc), one of the key roles of such an outfit would be to work as an advocacy and policy support platform to motivate line agencies to develop strategies for capitalizing on the reach and resourcefulness of telecentres.



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- **continuing development:** mechanisms and advocacy thrust must be deployed to encourage research and development on reducing barriers to ICTs (for example, development of easy PC interface for the ones with low level of literacy and exposure, research in the area of alternative sources of energy to power computer equipment and peripherals, development of mechanism for continually monitoring local information and communication needs, developing solutions for harnessing digital means to capitalize on local opportunities and prospects, etc)

Figure 14: Telecentres established under UNDP/MOST/HLCIT/NITC

District	VDC covered	Responsible agency	Type of connectivity	Date Established
Parbat	Katuachaupari	ICT4D	Dial-up	All in September 03
	Manjphat	ICT4D	Dial-up	
	Milanchowk	NITC/MoST	Dial-up	
Sunsari	Singhiya	ICT4D	Wireless	April 2004
	Dumraha	ICT4D	Wireless	
	Madhesa	MoST	Wireless	
Okhaldhunga	Okhaldhunga	ICT4D	VSAT	March 2004
	Rumjhatar	ICT4D	VSAT/Wi-Fi	
Mustang	Jomsom	ICT4D	VSAT	July 2004
	Marpha	ICT4D	VSAT	
	Tukuchey	MoST	VSAT	
	Kobang	HLCIT	VSAT	
Kathmandu	Bungmati	ICT4D/ PPP arrangement	Dial-up	July 2004
Kavre	Panaudi	HLCIT	Dial-up	September 2004
Makwanpur	Bashamadi	HLCIT	Dial-up	July 2004
Udaipur	Gaighat	HLCIT	Dial-up	July 2004
Nuwakot	Devighat	NITC		Augst 2004
	Garkhutar	NITC		



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Figure 15: Telecentres established by SPPD/UNDP-RUPP

Municipality	Ward	Type ¹²	Status (Oct., 2004)
Butwal	Ward # 15	B	Telecentre opened
	Khairani RMC	A	Telecentre opened
Hetauda	Adarsha TLO	B	Equipment provided but not opened; due to security
	Bhimphedi RMC	A	Telecentre opened
Pokhara	Ward # 18	B	Equipment provided but not opened; RUPP Local manager hospitalised
	Dulegaunda RMC	A	Telecentre opened
Tansen	Ward # 14	B	Equipment provided but not opened; no connectivity
Nepalgunj	Ward # 1	B	Telecentre opened
	Kohalpur RMC	A	Telecentre opened
Tulsipur	Ward # 9	B	Money provided but not opened; due to security
	Narayanpur RMC	A*	Money provided but not opened; due to security
Bharatpur	Ward # 7	B	Equipment provided but not opened; due to security
	Rajahar RMC	A	Equipment provided but not opened; no connectivity
Biratnagar	Ward # 11	B	Telecentre opened
	Rangeli RMC	A	Telecentre opened
TribhuvanNagar	Ward # 10	B*	Money provided but not opened; due to security
	Lamahi RMC		Money provided but not opened; due to security
	Baluwang RMC	A	Money provided but not opened; due to security
9 municipalities, 9 wards and 9 RMCs = 18 telecentres, 8 opened			
* Plus fax			

7.3 Other rural ICT initiatives

There is a lot of activity around Nepal to bring ICTs and their benefits to rural people. Below we outline a few of the better-known projects. Several more are mentioned in Annex-7.



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7.3.1 HealthNet

The medical network HealthNet¹³ provides online access for doctors and nurses to international health databases and Nepalese health information. A fibre Local Area Network connects more than 70 terminals on and near the Tribhuvan University Teaching Hospital campus, providing direct access for on-site staff. Distant doctors can access HealthNet using a secure dial-up method (their subscription also covers general Internet access). HealthNet provides week-long training for doctors who are not yet familiar with computers, the Internet and search methods.

As part of the UNDP APDIP (Asia-Pacific Development Information Programme), IDRC has awarded HealthNet Nepal \$30,000 for a 24-month project starting in June 2004 entitled “Telemedicine in Nepal: a pilot project”¹⁴. The project will focus on using email for communications among health workers, including transmission of images captured by digital camera, and will take place in three locations: Bhaktapur, Butwal and Jhapa.

7.3.2 Nepal Wireless

Acting on their own initiative, by obtaining support from international philanthropic and governmental organisations, a headmaster Mahabir Pun and colleagues are providing Internet by wireless connections in Nangi and 5 nearby villages in Myagdi District. This achievement has recently attracted an award from the Global Ideas Bank. More detail (based mainly on information provided on the project’s website) is provided in. We note in particular that:

- The tremendous success of this initiative has depended on the sustained personal dedication of a small group of individuals, over a period of seven years to date
- The computers and Internet access are provided in secondary schools, and are most used by pupils and teachers.

7.3.3 COPPADES Nepal ICT project¹⁵

The NGO COPPADES (Committee for the Promotion of Public Awareness and Development Studies) is working with World Computer Exchange and Computer Aid International¹⁶ to implement the second phase of *Nepal ICTs* project. The first phase of the project which was implemented in the year 2001 was to bring Computer and Information Technology Education to 75 rural schools and communities in rural Nepal. This second phase of the project in 2004 will bring computer and IT education and services to approximately 30,000 students and community youths in 87 schools in rural Nepal. In each school a teacher will be trained and 5 networked computers and related equipment will be provided. Plans are also being developed to bring computers to Tribhuvan University affiliate libraries to upgrade their services.

¹³ <http://www.healthnet.org.np/>

¹⁴ More details are available at <http://www.apdip.net/projects/ictnd/2004/L25-np/proposal> or from Dr Mohan Raj Pradhan, Tel/Fax: 01 442 9722, Email: mpradhan@healthnet.org.np.

¹⁵ Information from <http://www.coppades.interconnection.org/projectdetails.php?id=6> and supplementary papers provided by Dikendra Kandel.

¹⁶ www.worldcomputerexchange.org, www.computer-aid.org - both charitable organisations that provide refurbished used computers.



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7.4 Relevant research findings

7.4.1 SAPAP telecentre planning study

In 2002, the Nepal component of the South Asia Poverty Alleviation Programme (SAPAP) was ready to set up some telecentres using the Social Mobilisation approach. Unfortunately, owing to the deteriorating security situation, the programme was cut short before any telecentres could be opened. However, we can still benefit from its planning study. A survey of the SAPAP participating communities in Syangja District was conducted in 2002 involving 15 community meetings in 12 Village Development Committees and a total of 644 people. The purpose of the survey was to assess the extent to which the communities could make good use of ICTs. The results are shown in Figure 16 below¹⁷. The survey responses indicate an assortment of problems and opportunities to which improved information resources could be applied. They indicate the advantages that Social Mobilisation brought to the communities, as well as where it might take them when augmented with such information resources.

Figure 16: Findings of 2002 survey of how communities could use ICTs

Question	Summary Response								
"How has the SAPAP programme helped you?"	With the creation of community organisations for savings. With credit and loans and training. For acquiring self-reliance. A range of enterprise development activities; farming, irrigation, drinking water veterinary and maternity services, craft skills, plumbing, electrical. Women have overcome shyness.								
"What achievement are you most proud of?"	Irrigation, plantations, community buildings, roads, drinking water, livestock insurance, savings and credit, maternity care, veterinary services, sub-health post, hydro electricity, bio-gas, school building.								
"What are your future plans for development?"	Skills training, marketing, incorporation as a co-operative society, milk chilling, road construction, drinking water, livestock, sanitation, plantations, bazaar, craft industries, community shop, electrification, irrigation, telephone, playground, community radio, tourism, health centre, community building, women's community bank, higher education.								
"What problems is the community facing?"	Drinking water, unemployment, low prices, health, education, lack of knowledge, transportation, isolation, irrigation, communication, getting products to market, illiteracy, sanitation, electricity, finance, flooding, land slides, nutrition, old traditions (young women), low salaries.								
"How many people have seen, used a computer, know what it is, heard of the Internet?"	<table> <tr> <td>Seen a computer?</td><td>28.1%</td></tr> <tr> <td>Used a computer?</td><td>2.3%</td></tr> <tr> <td>Know what a computer is?</td><td>2.5%</td></tr> <tr> <td>Heard of the Internet?</td><td>8.1%</td></tr> </table>	Seen a computer?	28.1%	Used a computer?	2.3%	Know what a computer is?	2.5%	Heard of the Internet?	8.1%
Seen a computer?	28.1%								
Used a computer?	2.3%								
Know what a computer is?	2.5%								
Heard of the Internet?	8.1%								

¹⁷ Taken from South Asia Poverty Alleviation Programme (SAPAP) – Nepal Component, RAS/96/600 Feasibility Study into the use of Information and Communication Technologies by the SAPAP Communities in Syangja, Nepal



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7.4.2 SECEN/APT multi-purpose telecentre fieldwork

A recent study by the Society of Electronics and Communication Engineers¹⁸, while primarily concerned with testing data mining tools, has also produced a great deal of valuable information that is directly relevant to our present project. Accounts of study visits to Laos and Thailand are reflected in the International Overview, and we shall take note of the study recommendations when developing our strategy (the next stage of this project).

The field study carried out in 140 VDCs in 35 Districts of Nepal included interviews with around 2,000 households, and officials and (where available) PCO operators in each VDC. Questions included actual and planned phone use and ownership, exposure to various ICTs such as fax, email and photocopier, and views on the usefulness of and best location for a local MCT. We hope to access the raw data from this study and incorporate it into a demand model which will permit reasonable demand estimates for each District. Findings quoted in the report of immediate relevance to this Sector Overview include:

- High demand for telephone service: 62% of the households interviewed regard phonecalls as their preferred mode of communications, 75% habitually use public call offices (PCOs), and 95% have ever used PCOs, even though only 60% live 10km or less from a PCO. 40% would like to possess a phone, and 25% plan to possess one in the next year.
- The idea of MCTs had a mixed reception, seeming of little use to some of the communities visited. The most useful application fields for MCT were felt to be health and education, and the preferred locations would be schools or health centres.

¹⁸ *Applicability of Data Mining Tools for forecasting prospects of e-technology integration at the Multi-Purpose Community Telecenter (MCT)* Report by Society of Electronics and Communication Engineers, Nepal (SECEN) for Asia-Pacific Telecommunity (APT), August 2004



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ANNEXES

ANNEX 1: Visit of Various Institutions and Meetings/Interviews conducted

NITC-MOST

13/9/2004

Mr. Mahesh Kathayat, Executive Director.

1. Still not staffed properly
2. Activities also limited
3. trying to provide various forms for citizens on line

HLCIT

13/9/2004

1. **Member- Mr. Dhambar Bahadur Khadka**
2. **Member-Secretary-Mr. Atma Ram Ghimire**

1. They too seem to be trying to find answers as to the cost and management of telecentres.
2. 2 telecentres being financed and developed under HLCIT
3. Current Activities as per their Website (also mentioned by mem. Secretary)

- Electronic Transaction Act- has been enacted
- Driving License System
- accounting system for government offices
- System design for Citizenship, Passport
- Standardization of Nepali font
- IT Certification
- Telecentres establishments- as per website

Government of Nepal in its 10th five-year plan has stated the establishment of 1500 telecentres, the following are the list of telecentres established by HLCIT

- Tukuche, Mustang
- Gaighat, Udayapur
- Panauti, Kavre
- Bashamadi, Makwanpur

Tele-centre under the NITC

- Kowang, Mustang
- Milanchowk, Parbat
- Devighat, Nuwakot
- Sankhu, Kathmandu
- Madhesa, Sunsari
- Krishna chowk, Chitwan
-



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Tele-centre under the Information and Communication Technology for Development

- Katuwachaupari Majhphant, Mustang
 - Singhiya Dumraha, Sunsari
 - Garkhutar, Nuwakot
 - Rumjatar, Okhaldhunga
 - Jomsom Marpha, Mustang
- Strategic Business Plan for IT Park, Kavre
 - Dynamic Web Skeleton for HMG ministries

Conclusion- Seems necessary to delineate clearly functions of HLCIT and NITC. It appears that role of HLCIT is on policy and strategy development and help provide direction to the government for implementation of policies; coordinate inter-ministerial activities to implement the policies. NITC's role appears to be more on supporting implementation of policies whether it is ICT application in the country in particular in government.

NEPAL TELECOM

15/9/2004 and other dates

1. Mr. Sugat Ratna Kansakar (MD)
2. Mr. Bachhura Shrestha (DGM/O&M) and his staff
3. Mr. Madusudan Karmacharya (Manager/switching planning)
4. Mr. Amrit Prasad Shrestha (Director-Western Development Region)
5. Mr. Baburam Pokharel (Manager/ Transmission projects) and his staff
6. Mr. Birendra Shakya (Sr.E.E. / Planning Satellite networks)
7. Mr. Ananta Man Singh (E.E./ Planning fibre optic and CDMA networks)
8. Mr. Kamodmani Dixit (Manger/ Rural Telecom) and his staff
9. Mr. Subhash Bajracarya (Manager/ Mobile switching)
10. Ms. Binita Shrestha (EE/ Internet Service)

Discussion- basically on NTC existing future networks

REDP (Rural Energy Development Programme)

17/9/2004-29/9/2004

Contacted- Mr. Thakur Raj Devkota, Deputy Programme Manager

Established in 1996 - (UNDP/HMG)

WB joined -2003- through Power Development Fund (PDF)

Works under AEPC.

- a. Subsidies from 2003 major part comes from HMG (like World Bank contribution)
- b. In Micro-hydro, subsidies go for community owned projects only.



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- c. UNDP provides smaller doses of subsidies like – in toilets
- d. Mr. Devkota says that all components of energy programme are driven through community mobilisation aspect.
- e. Working in rural energy programmes through subsidy policy and associating private sector, NGOs, and VDCs, communities in delivery and reasonably well functioning Institutional setup for transparency in operations is real gain for increasing access to Energy and better life for rural people.
- f. Latest statistics on micro hydro developed through REDP will be made available via email

AEPC (Alternate Energy Promotion Centre)

Date 20/9/2004

Apex National Body to implement government's Rural Energy Policy

Hydro- up to 100kW (micro-hydro), Solar, Improved Cooking Stove (ICS), Biogas, Wind

Established in 1996- supported by ESAP (Energy Sector Assistance Programme of DANIDA- a long term programme of assistance to Nepal)

Funding – HMG/ DANIDA/ NORAD/ EU

1. Dr. Madan B. Basnyat, Executive Director,
2. Mr. Devendra Prasad Adhikari (coordinator- micro –hydro)
3. Mr. Saroj Rai (coordinator- Solar Energy)
4. Mr. Vishwa Bhushan Amatya (Sr. Advisor, Energy Planning and Productive End-use)

AEPC, its function, and way it works how subsidies are managed, how rural energy is promoted, donors and their support and association in the programme. Notes on Rural Electricity cover basically the activities.

MLD (Ministry of Local Development)

Date 23/9/2004

Persons met:

1. Mr. Gaga Datta Awasti , Joint Secretary- govdiv@mls.gov.np
2. Mr. Rashmi Pandey, Under Secretary- lbss@mld.gov.np
3. Babu Ram Gautam, Under Secretary- ipd@mld.gov.np
4. Shanker Raj Pathak gis@mld.gov.np samyam@wlink.com.np (home)



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Discussion points:

1. Direction of Decentralisation programme, local governance development
2. How ICTs are currently being used in MLD
3. How rural communities could benefit from ICT programme

Salient points which emerged:MIS-Management related

1. All the disbursement for district level expenditures for all the line ministries has to pass through MLD to respective DDC (district development committee)
2. MLD to monitor expenditure and progress
3. Reporting and monitoring system is to be developed – which they are thinking of seriously and going through field trial in district of Udayapur -DMIS (decentralised management information system). This will be very important area they will be working- to see that reporting takes place for monitoring from VDC-DDC-MLD
4. ICT Master Plan is yet to be finalized. Under circulation for comments from the authorities concerned with in the Ministry
5. Makwanpur DDC- announces all the expenditure allocated to respective units /VDCs so that people will see that expenses are transparent

ICT related

1. At least access for email and Internet should be on local call rate- not STD- to facilitate access in the first place
2. Local community radio on FM can support democracy/ market information and transparency in local governance/ action of line agencies-peoples voice
3. Right to information – should be the fundamental human right – to preserve and promote telecom and information services- keep warring parties from interfering with communication infrastructure and services
4. MLD should be working very closely with MOIC/MOST and other ministries in ICT for rural development- MLD should always be partner in this respect
5. Rural Poor should be the Focus - trickle down should be real and substantive
6. ROLE of HLCIT/NITC/MOST/MOIC/NTA should be clearly delineated.
7. PDDP/LGP - has been merged into one as DLGSP
8. Social mobilization should be part of the ICT for rural area
9. GIS data base and updating is now entirely MLDs responsibility
10. VDC data on sampling basis prepared earlier-now is going through massive change with absolute data VDC wise being incorporated. One DDC of Dolakha was prepared with the effort of DDC chairperson within 3 months. Therefore, it may look big job but it can be done quickly provided DDC's generously involve with each VDC taking responsibility of its VDC info- some 500 items of data with attributes are being put in
11. Settlements will be defined and plotted carefully.
12. Influence area of any service shall be reasonably defined and described as attribute (population served)



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AGRICULTURE DEPARTMENT

Date 23/9/2004

Mr. Daman Dhugana- DDG

1. Explained how departments work
2. All appointments takes place within department
3. All staff are designated to DADO
4. DADO then posts them in respective service centres
5. Agri/ livestock are two parallel departments so both of these units have their respective district and service centres
6. Service centres work through farmers groups
7. Agriculture perspective plan is not being implemented in the form it was formulated — reduced operations
8. Information and communication is under division under the MOAC.
9. Investment or priority areas are defined
10. DADO works under DDCs. They work for various infrastructure for agriculture with respective line agencies and coordinate their programmes in District level.
11. Department seems to lack in access to email and internet for the department

AGRICULTURE INFORMATION AND COMMUNICATION CENTRE

Date 23/9/2004

Dr. Hari Dahal- Chief

1. Radio Nepal- 15 minutes- 365 days- programme is prepared by the Centre
2. NTV- 15 minutes 365 days- programmes prepared by NTV
3. Publications-press-2
4. Bimonthly – for generally farmers also for technicians
5. Booklets, folders, posters, Calendar- about 6000 copies
6. Distribution is bit cumbersome
7. 5 units in the region to produce local programmes for radio
8. Wants to start phone in programme
9. Wants to start with new communication information policy
10. Wants to start agro news in each broadcast programme
11. Radio- cheapest way to communicate with large mass
12. Websites- does not have material to post
13. Participate in SAARC Agriculture Information and Communications- Seminar in Dhaka soon
14. www.saic-dhaka.org



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ISPs

Date 23/9/2004

1. Pawan -president
2. Rupesh- PP GS
3. Ajit- Member
4. Binay- General Secretary
5. Deepak

Matters for discussion

- ISP operations
 - i. Growth in customers-
 - ii. Regulatory problems in operations
 - iii. Connectivity /
 - iv. Applications
- How can we expand services to less developed area
 - i. Operations and cost of establishing pops by private sectors
 1. connectivity
 2. other regulatory obstacles
 3. what is required in terms of public partnership
 - ii. telecentres
 1. private sector
 2. community ownership

Responses/ discussion

- One ISP said it is 5-10 % per month. The other guy said he has about 30% annual growth in customer base. But actual profits are not increasing due to the competition.
- Estimate of total internet accounts couple of months back worked out 48,000.
- Applications basically are:
 - i. Email
 - ii. Information search
 - iii. Chat
 - iv. Voip calls by cyber cafes
- Corporate customers-?
- Bandwidth of internal traffic-2 mbps- through NPEX (Inside country)
- Main problem is the sector is heavily taxed – whereas most countries do not have regulatory charges like license fee etc.
 - i. Charges- back bone connection-5% of the charge NESP (VSAT)
 - ii. License fee+2% of revenue RTDF+4% royalty
 - iii. VAT 10 %



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- Regulatory burden is too much-
 - i. MOIC charges fees and has to obtain separate license for frequency even in the bands which is elsewhere available as ISM band and is license free band.
 - ii. Regulatory procedures too cumbersome and full of hustle for small operators with different offices having different interpretation of rules.
 - iii. Equipment import under license also has very cumbersome and archaic procedure even in the present scenario of modern communication and information age.
 - iv. There seems lack of desire for entrepreneurship development among some licensing authorities
- Market extension in the rural and peri urban area is fraught with connectivity costs for POPS in rural areas.
- Monopoly or dominant operators is squeezing and wants to sell ADSL facilities on bandwidth basis and trying to avoid to provide physical pair lease. In the other country's even unbundling of loop is legal requiring and they have provide physical network for ADSL network to a third party
- Nepal telecom is not interested to provide lease circuits to ISPs and NTA has been able to curb uncompetitive and dominant behaviour of big operators.
- NTA is treading very traditional path in liberalising services even if it was said even in 1999 telecom policy.
- Discussion could not go into costs of POPs in the district costs
- However, strong feeling that policy makers/ regulators seem to discriminate between Nepal Telecom and the other operators.

DEPARTMENT OF HEALTH

Dr. B.D. Chataut (DG) -

Date 24/9/2004

1. Patan Hospital-Palpa- some telemedicine, -by UMN
2. Vietnam, Burma, Bhutan use some sort of Telemedicine- hilly countries like ours
3. Norway govt wanted to help us then they studied our infrastructure status- but programme some reason did not start

History of health service dev

4. Before 50 years ago we had only some dispensaries- about 4 or 5 in tarsi low lands to fight malaria because land revenue would not come otherwise, to Rana rulers
5. Now 70 district hospitals, 9 Zonal hospitals, and etc
6. VDC Sub health Post, Health post in 9x75 = ilakas
7. Primary health care centre (PHCR)- 205 constituencies
8. Hospitals - 71 district level and 9 zonal level



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9. 4000 Doctors, 4000 Staff nurses, 4000- Anamikas AHW-4000 (Auxiliary Health Worker-),
10. 50,000 fifty thousand health volunteers (generally – 30 year or above, women, widows preferred, selected by like Ama Samooh, not to be from daughters and daughter inlaws of influential guys like VDC authorities)
11. Number of programmes Vitamin A, DOTS < Polio< Smallpox finished but maternal morbidity rate is alarmingly high 539 in (100,000) live births elsewhere in S-Lanka-10/15- which is the developed country figure.
12. 3 Ds kill- decision as to what to do; decision as to how to transport; decision as to whether service is available or not – kills
13. So definitely telemedicine will help- communication will help.
14. must design – projects

HMIS- health management information system unit

1. Form no 31- information is collected from – Health Volunteers - village health worker - Form no 32 sub health post - Ilaka 9 - DHO-33 - Region-34 centre - from origin to end in 2 months to all programme divisions for their program
2. system paper based forms
3. New strategy is to be designed soon- additional information is demanded by the programme divisions
4. transport by electronic means will be better

INTERVIEW REPORT

LI-BIRD (<http://www.libird.org>)

Dr Pratap Shrestha, Director of LI-BIRD

LI-BIRD (<http://www.libird.org>) is a Nepalese NGO based in Pokhara which works closely with the Ministry of Agriculture and with farmers across Nepal to improve farming methods.

Twice weekly they broadcast a half-hour regional FM radio programme “LI-BIRD Ko Chautari” on agriculture, which reaches about 10 surrounding Districts. The programme is very popular, and many listeners’ clubs have been set up, which often write in with comments. It was launched with a \$5,000 grant which sustained it for a year. Now they are continuing to fund it from various project funds. Airtime costs them 15,000 NR a month – it would be more for national radio.

They feel radio is an ideal medium at present because with radio sets now costing as little as 100 NR, nearly every household has one, and the programmes are easily shared. In due course they would like to use television too, but access to television viewing is very much less, generally confined to better-off households who will not want to invite everyone into their homes. Installing a community television in a communal space such as the largest room in a secondary school could be a good approach. To watch a good programme, people would be prepared to go out in the evening and even pay a nominal charge.



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Phones of course will be popular everywhere. Internet will have more limited appeal. But all these ICT options should be open for VDCs to choose among for themselves. They will have access to development funds from central government and may want to put ICTs into their plans. Democracy is becoming more meaningful at the local level, so VDCs can really reflect local needs. The Community Organisation (CO) movement also is very positive; equipment which is cared for by a CO should be safe from attack.

The argument that ICTs should not be provided in Maoist-held areas because they would help the Maoists is a poor one. The Maoists (like the Government military) already have the communications that they need for their operations.

Dr Shrestha has travelled extensively in India, and seen the Village Information Centres near Chennai in action. He thinks an approach like this could be viable in peri-urban areas of Nepal.

Related initiatives mentioned:

- Mahabir Pun's Internet-to-villages project in Myagdi District. (Dr Shrestha and Mr Pun are neighbours in Pokhara).
- Shanti Griha, a German-assisted NGO which provides training in computer skills for young people.



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ANNEX 2: Telecentres Visited

1. Visit to Panauti Multipurpose Community Telecentre

On Friday 8 October 2004 at about 4:00 pm Mr Bora and Ms Milne visited Panauti Telecentre, which opened on 15 July 2004 under the auspices of HLCIT. Normal opening hours are 10:00 am to 5:00 pm each day except Saturday.

The Telecentre is situated in a former Ward Office by the side of the road between Panauti and Banepa, a few kilometres from each. The population within a kilometre of the Telecentre is probably under 200 and there is little passing traffic. Kathmandu University is nearby, but has its own facilities. A small secondary school opposite supplies students to the Telecentre's courses (see below).

The building seems solid and well-built, with a locking door and a good roof. There is plenty of space inside and all necessary furniture for the two computers and associated equipment (UPS, scanner and printer). The computers are modern and furnished with appropriate software.

The Telecentre has two staff, a Manager (Mr Suresh Thapa, who was not present but phoned to answer questions during our visit) and an assistant who received us and who delivers the courses.

The major activity at the Telecentre is provision of basic computer courses. The first intake of 12 students is still completing its 2-month course. These 12 are evenly divided between male and female, and are all from school years 10, 11 and 12. The year 10 students attend the school over the road, while the others come from a school 2 kilometres away.

Students are taught in 3 batches of 4 students. Each batch has a daily session of 1.5 hours. The fee is 600 NR per student. The assistant's own grounding (following secondary school) was a three-month computer course at Banepa Computer Institute, also of 1.5 hours daily, for which the fee was 2,500 NR.

The assistant was not aware of any cybercafe in either Banepa or Panauti, although one may have been recently established. The Telecentre offers public Internet access, but very little use is made of this because of the high price of phone calls (5 NR a minute). Rates are halved on Saturday, when the Telecentre is closed. Lower rates might be available through Nepal Telecom's ISP, but the Telecentre is bound to use the HLCIT as ISP, which is not currently able to offer lower rates.

The Telecentre also offers telephone service at rates that are lower than the local competition, and makes around 500 NR a month from this. The Telecentre services are known in the nearby village and in Panauti town, but have not been advertised in Banepa.

Our visit lasted about 45 minutes. During this time one of the course students arrived to use a computer, watched by a small boy. There were no other visitors.



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2. Report on Visits to Sunsari Tele-centres (15 November, 2004)

A) DUMRAHA VDC – RURAL INFORMATION CENTRE

Date telecentre launched: Nearly 1 year.

Location: Eastern Development Region, Koshi Zone, Sunsari District, Within 3 km north from the east-west highway.

Building: In the VDC building adjacent to Sanischare Lower Secondary School.

Description of location: Rural area connected to the highway by gravelled/Kachhi road. VDC is known to be second largest in area amongst the VDCs in the district. Predominantly dependent on agriculture and job workers in other parts of the country and abroad.

Estimated population: Approximately 20,000

Development level of location: One sub-health post, 2 high schools, 1 lower secondary school and 4 primary school, electricity in nearly 75% of area.

Accommodation available to tele-centre (square metres): About 10 sq.m. room

Equipment available at tele-centre: 2 Computers, 1 Photo-copier, 1 Printer, 1 VOIP Switch, 1 Scanner, 2 UPS, 1 Phone, 1 Web-camera

Connectivity of telecentre: Radio connection with Sunsari DDC Hub and Sunsari DDC Hub connected to Purbanchal University VSAT/Dialup connection through radio communication.

Staffing of telecentre: During the project time - one manager and two operators. Currently, one operator only.

Main services offered and charges for them: Phone communication (local, STD, ISD) – currently not in operation, Desktop Publishing, Photo Copying

Opening hours: 7:00 am – 6:00 pm (When phone line was in operation)
10:00 am – 5:00 pm (Currently)

Actual availability of Internet (% of opening hours when connection works): The Internet service was not made available to the public from the beginning. Connection never lasted more than 10 minutes. Currently completely not in operation since last 1 month.

Actual speed of Internet connection when working: Very slow.



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Estimated number of people using the telecentre in a typical day: 10-30 users / day.

Estimated total number of people who have ever used the telecentre: Only 2 months of regular operation so far.

Main services used and purposes of use: Telephone communication, Photocopying

Revenues collected in a typical day:

During regular operation: Average Rs.500-600/day, Maximum Rs.1100/day

Currently : Rs 200/day.

Remarks: Due to ineffective maintenance support, communication services are not in operation. After the completion of the UNDP's Information for Development project, the user committee has continued the service of only one operator.

Person interviewed: Mr Naresh Kumar Choudhary, Past Manager, RIC

B) SINGHIYA VDC – RURAL INFORMATION CENTRE

Date telecentre launched: Nearly 1 year.

Location: Eastern Development Region, Koshi Zone, Sunsari District, Within 1 km north from the east-west highway.

Building: In the Sub Health Post building.

Description of location: Rural area connected to the highway by gravelled road. Predominantly dependent on agriculture and job workers in other parts of the country and abroad.

Estimated population: Approximately 15,000-16,000

Development level of location: One sub health post, 2 high schools, and 6 primary schools, electricity in nearly 90% of area.

Accommodation available to tele-centre (square metres): About 20 sq.m. room with half of the area used for equipment.

Equipment available at tele-centre: 2 Computers, 1 Photo-copier, 1 Printer, 1 VOIP Switch, 1 Scanner, 2 UPS, 1 Phone, 1 web camera

Connectivity of telecentre: Radio connection with Sunsari DDC Hub and Sunsari DDC Hub connected to Purbanchal University VSAT/Dialup connection through radio communication.



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Staffing of telecentre: During the project time - one manager and two operators. Currently, one operator only. All 3 staff during the project period left the project and a new operator with office diploma has been hired.

Main services offered and charges for them: Phone communication (local, STD, ISD) – currently not in operation, Desktop Publishing, Photo Copying
 Word processing/printing: Rs 10/page
 STD Charges to Kathmandu: Rs 10/minute
 Local call charge: Rs 2/call.
 Photocopy : Rs 2/page, Rs 1/page if more than 50 pages of copies is sought.

Opening hours: 10:00 am – 5:00 pm (Currently)

Actual availability of Internet (% of opening hours when connection works): The Internet service was not made available to the public from the beginning. Connection never lasted more than 10 minutes. Currently completely not in operation since last 1 month.

Actual speed of Internet connection when working: Very slow.

Estimated number of people using the telecentre in a typical day: 10-25 users / day.

Estimated total number of people who have ever used the telecentre: Phone lines were only in operation for 1.5-2 months so far.

Main services used and purposes of use: Telephone communication, Desktop Publishing, Photocopying

Revenues collected in a typical day: During regular operation: Average Rs. 300-500/day. Phone communication was the main source of income.

Remarks: Contents in agriculture information, computer aided teaching/learning could be useful. Support from Purbanchal University (PU) has not been effective. A delegation had gone to PU but has not been effective. Also PU does not take the responsibility of phone line connectivity problems.

Person interviewed: Mr Parashu Ram Rai, Chairman, RIC Users Committee
 Mr. Laxmi Choudhary, RIC Operator

C) SUNSARI DISTRICT DEVELOPMENT COMMITTEE – DISTRICT INFORMATION CENTRE

- The project has been launched for last 3 years. However hub was installed for last one year. Antenna tower is linked with the Purbanchal University (PU) and 3 VDCs (Dumraha, Singhiya and Madhesha).



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- No technical staff has been posted in the hub site. When fully in operation, operators from VDCs were scheduled for switching on/off the hub. Operators are only knowledgeable for the operation of the system and cannot do any level of maintenance.
- PU students were posted for the on-the-job training.
- RIC users committee is not active.
- UNDP project was closed before rural community was fully aware of the benefits that can be obtained from these tele-centres.
- Mostly people were using it for phone calls.

Person interviewed: Mr Bhesh Raj Ghimire, Program Officer, DDC

D) PURBANCHAL UNIVERSITY, INSTITUTE OF SCIENCE & TECHNOLOGY, BIRATNAGAR

- Agreement was done by the university without consultation with the institute. It has vaguely defined the technical support and makes a provision for 2 visits per year @ Rs 250/day to be paid by RIC. The agreement does not explicitly define different aspects of technical support that is expected to be provided.
- RIC calls PU for the support almost every day and the cost cannot be borne by the institute in sending its faculty or its staff so regularly as their first task is to conduct the classes in the institute. There is no budget provided by the university to the institute for the support to be provided.
- VSAT link is only meant for downlink, and for uplink, dialup connection through Nepal Telecom is used. The cost of dialup link comes out to be Rs 12,000/month in average if it is to be in operation for about 8 hours /day. Half of this cost is supposed to be paid by RICs.
- PU has received Disc Antenna, Router, Grid Antenna and LMB from UNDP project for the purpose of providing Internet communication to the RICs through Sunsari DDC hub.
- No initiation has been taken by RICs in making any of site visit rates and 50% cost of dialup connection charges. Institute is not able to provide free service to RICs.

Person interviewed: Mr Phanindra Gautam & Nirish



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ANNEX 3: Visit of (Community Radios and other ICT facilities)

I. COMMUNITY RADIO MADANPOKHARA

(Data as per the year 2003)

1. **Date Community Radio launched** – 2056/12/25
2. **Location** – Madanpokhara VDC, Palpa District, Lumbini Zone, Western Development Region
3. **Building** – Own building at 1046 metres amsl situated on northern flank of a hill range facing Tansen. 3 storied house with 11 rooms, land is 12.75 anas (4363 square foot).
4. **Description of location** – Is rural area 1.5 kms from the Sidhartha Rajmarg (highway joining Bhairahawa and Pokhara) and 11 kms South of Tansen Municipality. A progressive village rich in commercial crops and leaders in development in agriculture.
5. **Estimated Population benefiting** – Covers whole of Palpa - which has a population of 268,000 people and some areas of adjoining districts like Synagja, Tanahu, Gulmi, Rupandehi, and Nawalparasi.
6. **Development level of location**
 - a. Literacy - district 65.9% (female 57.5, male 75.9), VDC (69% female and 86.1% male)
 - b. Transport accessible by vehicles, electricity available, very progressive VDC with several agriculture development features – tomato, coffee, ginger and dalchini commercial crops
7. **Radio stations facilities-**
 - a. Two transmitters-100 watt each (1+1)
 - b. Studio equipment
 - c. Stand-bye generator-batteries
 - d. VSAT- for receiving news items
8. **Staffing of centre-19 regular staff out of total of 108**
 - a. Day to day management
 1. admin - 4 men, 1 woman
 2. transmission - 7men,4 women-11
 - b. **Radio representatives** - 21 men and 5 women - nominated radio representative of VDCs and Municipalities, who collect news of respective VDC/municipality and produce programmes as decided by the monthly meeting of Committee of Reps.
 - c. **Radio contact Person** - Prior to being nominated as radio rep nominated persons nominated for training on radio journalism and basic training) - 8 men 12 women



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- d. *Community Manpower* - persons for broadcasting and programme production on fully voluntary basis selected from local teachers, social workers, entrepreneurs, Framers, experts - 10men and 1 woman
- e. *Correspondents from Adjoining districts* – 6 men
- f. **Total manpower-** 79

9. The Structure of Radio Cooperative committees and Listener's Clubs

- a. CRM programme VDC has at the most 1 listener's group (Listener's Club) per Ward. Total number of such clubs are 86 and total membership is 1290
- b. One Main Listener's Club (or Radio Cooperating Committee) at VDC level consisting of at least 7 members out of total number membership of all the listener's groups of a VDC is formed.- Total number is 23
- c. 2 members from each Main Listener's Club (Radio Cooperating Committee) of a VDC go to form District Assembly.
- d. The District Assembly thus formed elects 11members among themselves to form a District Committee.

10. Activities of various units under above structure

- a. The entire Listener's Clubs prepare their annual activities plan and send their annual calendar of operation to the CRM. Mainly activities of these clubs consists of
 - 1. awareness building street dramas
 - 2. cleaning their surroundings
 - 3. tree plantation
 - 4. maintenance and construction of trails
 - 5. construction of community buildings and public toilets
 - 6. interaction to eradicate the bad practice and traditions
 - 7. competition in quiz, folk songs and dances, public speaking, paintings, essay writing, and poetry
 - 8. helping in natural calamities and accidents,
 - 9. religious tolerance and racial harmony related activities
- b. The VDC level Radio Cooperating Committees produce various programmes and dramas for the transmission by CRM.
- c. The District Committee performs following functions:
 - 1. to keep record of the activities of lower level clubs
 - 2. to hold various cultural programmes in the district level to help CRM financially

11. Currently there are 32 Radio Cooperating Committees (one per VDC) and increasing at the rate of 5 every year.



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12. Transmission time hours-

- a. *Morning* - 5.30am-10:00 am (4 hours 30 minutes)
- b. *Day* - 11.55am-3.15pm (3 hours 20 minutes)
- c. *Evening* – 5:00pm-9.30pm (4 hours30 minutes)

13. Programme:

- a. *Main Objective*- Knowledge, information and entertainment
- b. *Programme is structured as below:*
 - i. Build awareness of women, aged, children, youth and marginalised and suppressed tribes through the programmes broadcast.
 - ii. Programmes are prepared which contains the voice of workers to policy makers of the community in cooperation with the community.
 - iii. Programmes on current topics prepared through fully voluntary services of teachers, students, intellectuals, and farmers of the community are broadcast
 - iv. Skills, experiences and know-how of people is broadcast
 - v. The presentation of art and voice of the people of community every Saturday has become very popular in the community.
 - vi. “Kayakairan” the current news and events from the papers of the Capital keeps people who are otherwise remote from news sources informed
 - vii. Transmission through Magar language promotes and develops the language, art and culture, in areas of Palpa and adjoining districts widely populated by magars.
 - viii. The programmes include daily the news, events and information of VDCs sent by radio reps and radio contact persons.
 - ix. The constructive contribution of Radio reps and Radio committees has made the community responsible and also proud of their development works.
 - x. The programmes also promote indigenous culture and traditions through transmission of traditional social, religious, and cultural events, festivals, markets and important national religious rites and events.
 - xi. Radio Madan Pokhara has contributed to the strengthening of people’s feelings for, and development of sustained awareness through its voice for democracy, human rights, and good governance.

14. Cost of establishing - altogether about 2,500,000 rupees on all equipment.

- a. *Equipment- Transmitter*- Chinese transmitters are cheap but not reliable (major cost is generally on transmitter and tower and antennas)
- b. *Studio Equipment*- Basic
- c. *Power required*- cost is 4000/ per month



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15. Observations

- a. The Radio is being run by highly motivated leaders. They are proud to be an example in community radio. Earlier established with little expenditure and low power cheap transmitter has been upgraded to 100 watt transmitters and Lattice tower along with VSAT equipment for receiving current news from the capital to broadcast at 6 am in the morning. The improvement in the equipment came with UNESCO assistance.
- b. Currently CRM is running a programme called People Centred Advocacy through Community Radio (PCACR) with MS Nepal. The components of the programme are as below:
 - i. *Empowerment of community through PCACR* it aims to empower people of 36 VDCs in order to raise their socio economic status. This is related with enhancing the quality, quantity and variety of programme development and broadcasting it on the basis of the need of the community and maximising the community participation and ownership.
 - ii. *Institutional Capacity Building of Community Radio Madanpokhara (CRM)* In this CRM will be supported for creating its presence/reach in each VDC of the programmes area in terms of developing VDC level radio cooperation committee, volunteer reporters, leader volunteer, listening centres, listener's clubs and strengthening their capacity.

16. Basic Issue

The community radios are basically having problem with maintenance of their transmitting equipment. Normally they have stand by transmitter. For training in programme development they do not seem to face any problem.

17. Persons Met

1. Mr. Gunakar Aryal- Manger of CRM
2. Mr. Nagendra Pandey- Tomato Grower- sort of research farm, he is also member as progressive farmer to NARC (National Agriculture Research Centre)
3. Mr.Dhakeshwor Ghimre- President of Nepal Coffee Growers Federation (12 districts are involved)
4. Mr. Dinesh Gautam- villager who helps voluntarily the VDC in its endeavour

II. RADIO LUMBINI

1. **Objective**-To provide education, information as well as entertainment to the people living in Lumbini Zonal Area.
2. **Location** – Anandavan VDC, Manigram, Rupandehi District, Lumbini Zone, Western Development Region – located 8 kms south of Butwal on the road joining Butwal and Bhairahawa (Sidhartha Rajmarga)
3. **Estimated Population benefiting** – Rupandehi, Nawalparasi, Kapilvastu, and some parts of Arghakhanchi, Palpa and Gulmi



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4. **Accommodation available to the facility (square metres)** – is housed in rented building.
5. **Radio stations facilities-**
 - a. Two transmitter-500 watt (100 watt stand by)- Rs 1,800,000 worth
 - b. Studio equipment- not much involved in terms of expenses-mixer, mic, audio equipment – Rs. 250,000 worth
 - c. Stand-by generator-batteries for 10 hours stand by capacity
6. **Programmes are structured as below:**
 - a. Bring about social and economic change,
 - b. Raise the voice of women, children, aged, socially marginalised groups like disabled people,
 - c. Build awareness education, health, nutrition, sanitation, environment, sustainable development, human rights, rights and duties.
 - d. Inform people about modern agriculture technology, animal husbandry and alternative sources of income.
 - e. Inform people about the local developmental activities,
 - f. Promote and Develop local dialects, culture
 - g. Cultivate the feeling of friendship and cooperation among people of different castes, language, religion and culture
 - h. Help alleviate poverty
7. **Staffing of centre-34 full time staff**
 1. Radio Cooperating committees from VDCs – 23 in number
 2. Main listeners groups – 23
 3. Radio Listeners club – 86 in number with total membership of 1290
8. **Transmission time hours- 18 hours**
9. **Annual operational budget – Rs. 4,900,000**
10. **Cost of establishing**
 - a. Equipment- Transmitter- Rs. 1,800,000
 - b. Studio Equipment- Basic (Rs. 250,000)
 - c. Listener's clubs- committees
11. **Observations** Radio Lumbini (RL) has maintained its nature by making it non-profit organisation. Though owned by member of the cooperative, they have the rule that no dividends will be paid out of the profit. Rather they will reinvest for the development of the Radio for community development purpose. Further, Radio Lumbini is also running two projects one with MS Nepal and the other with UNESCO. Nature of the project with MS Nepal is same as that of CRM.
12. **Persons Met**
 - a. Mr. Chapagain - Programme Director
 - b. Mr. Gandalf - Programme Editor



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III. COMMUNITY MULTIMEDIA CENTRES (CMC) IN PALPA AND RUPANDEHI

1. UNESCO is working with Radio **Lumbini (RL)** in Rupandehi and Communications **for Development (C for D)** in Palpa to train the poor students or adults who are interested in the basic computer use along with Internet and email. RL has 9 computers from UNESCO along with printer fax and scanner. This project is called CMC (community multimedia centre). 3-month training is given to the students for learning to use Word, PowerPoint and Excel along with Internet and email. About 84 students are trained in every three months. Students are selected from government schools and particularly on the basis of their economic status. Poor students are the target.
2. Is an NGO located in Palpa who in the name of Ratna Cable (Prior to Licensing of cable networks was prevalent) has been producing local programmes and broadcasting them on their Cable network. Now Ratna Cable network has been taken over by Shreenagar Cables. The programmes produced by C for D is still broadcast through Shreenagar Cable one of the two local cable operators in Tansen. Programmes are basically based on local news and local events both developmental and cultural in nature.
3. Currently the (C for D) is engaged in CMC (Community Multimedia Centre) Project with UNESCO which is similar in nature as that of RL mentioned above. Only difference is that C for D includes basic TV programme production audio also in the syllabus of basic computer training. Students who have gone through CRM training and interested in TV programming are now producing the local programmes.

IV. CYBER CAFÉ IN TANSEN

Tansen is a municipality. It has one cyber café opened by the World Link (ISP) operating in Tansen since last 9 months. The ISP has a leased circuit connected to its base in Bhairawa of 19.2 kbps. It has only about 30 connections. The Cyber Café has 6 computers and at the time of the visit all stations were busy. However, the café owner said that he has in average only 30 odd customers a day and average usage is for ½ hour. The charges for cyber café use are 40 rupees per hour.



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ANNEX 4: Current Telecoms and Internet tariffs

1. Local call

Particulars	Nepal Telecom (Rs)	UTL (Rs)	Remarks
Minimum Monthly Rental for Local Telephone (with 1. 175 free calls)	200/-		
Installation Charge (Drop wire and accessories shall be borne by the customer)	1800/-		
Charge for excess call (more than 175) per call	1/-		
Charge for a Call to Mobile from Local Exchange per minute	1/-		

Note: 1call duration -2minutes (08-1800hrs), 4minutes (1800-2200 & 0600-0800hrs) 8minutes (2200-06hrs)

2. Nepal Telecom's Domestic Long Distance (STD) Tariff Rate:

Band	Distance km	Business hour (08:00- 18:00)	Normal hour (18:00 - 22:00)& (06:00 - 08:00)	Off hour (22:00 - 06:00)
A	0 - 50	2.50	1.70	1.00
B	50 - 200	5.25	3.52	2.10
C	Above 200	6.50	5.00	3.00

3. Tariff for International Long Distance (ISD) Calls

(except India) Via Satellite	Dial "00" + Country Code + City Code + Tel. No. <u>India Via Both Terrestrial & Satellite Link</u>	Countries other than SAARC
6 a.m. To 8 p.m. - 25/- Per Minute 8 p.m. To 6 a.m. - 20/- Per Minute	6 a.m. To 8 p.m. - 25/- Per Minute 8 p.m. To 6 a.m. - 15/- Per Minute	25/- per minute

4. Nepal Telecom's Internet dial-up tariff

Hours-->	10 Hrs	25 Hrs	50 Hrs	100 Hrs	300 Hrs	600 Hrs	1000 Hrs
1 Month	300.00	600.00	900.00				
6 Months			1,500.00	2,400.00	5,000.00	7,500.00	
1 Year				2,700.00	6,000.00	9,000.00	12,000.00



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5. UTL's Local Tariff

SN	Items	LST-2500 (voice, data, EPBX, parallel phone, cordless phone compatible)			LST-2500F (voice, data, EPBX, FAX, parallel phone, cordless phone compatible)			LSP-3000 (voice, data)		
		Local	STD	STD/ISD	Local	STD	STD/ISD	Local	STD	STD/ISD
1	Deposit	None	2000	3000	none	2000	3000	none	2000	3000
2	Installation/ Activation Charge	2000	2000	2000	2000	2000	2000	2000	2000	2000
3	HMG Ownership Tax	1500	1500	1500	1500	1500	1500	1500	1500	1500
4	Initial payment for Wave phone terminal	4999	4999	4999	7999	7999	7999	6999	6999	6999
5	VAT @ 10% on items 2 & 4	700	700	700	1000	1000	1000	900	900	900
6	Total initial payment at the time of registration	9199	11199	12199	12499	14499	15499	11399	13399	14399
7	In case customer make down payment of 3600/-	3600	3600	3600	3600	3600	3600	3600	3600	3600
8	VAT @ 10% on item 7	360	360	360	360	360	360	360	360	360
9	Total initial payment at the time of registration with down payment of NRs 3600	13159	15159	16159	16459	18459	19459	15359	17359	18359

Typical Internet tariffs - private sector ISP (Rs)

Type of Service	1 Month	3 MOonths	6 Months	1 Year
Night (Midnight 7 am)	300.00	700.00	1300.00	2400.00
Day (9am-6pm)	900.00	2500.00	4800.00	9000.00



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ANNEX 5: Prevailing and proposed laws related to IT

In spite of commitment of HMG no enactment of any laws to recognize, promote and regulate ICT or E-commerce have been made after 2001 announcement of IT Policy. Therefore, umbrella law to govern IT, only as a means of telecommunication is Telecommunication Act, 1997 and Telecommunication Regulations 1998.

The prime objective of the Act is to regulate telecommunication services, which as per the Act means "a service relating to the acts of the conveyance or reception of any sounds, signs, signals, writings or images by the wire, radio, optical or other electromagnetic systems whether or not such signs, signals, writings, images, sounds or intelligence **have been subjected to rearrangement, computation or other change in any manner for their emission, transmission or reception.**"

No separate laws to regulate the information services exists in Nepal, moreover the definition of the " Telecommunication " in the Act has tried to incorporated both communication and information services within the scope of NTA. Thus, NTA has been sole authority to regulate ICT services in Nepal.

The Telecommunication Act, 1997 has following related provisions:

- Establishment of Autonomous Telecommunications Authority (Section 3)
- Telecommunications Service to be operated with License (Section 21)
- Licensing Procedure (Section 22,23 and 24)

Moreover the Act also contains provisions to "Develop, Expand and Operate the Telecommunications Service in the Directed Area ".

As per the section 30 of the Act, NTA has authority to direct any license holder to invest prescribed percent of its total investment to develop, expand and operate telecommunication services in rural areas. Rule 25 of the Telecommunication Regulations, 1998 has fixed such investment as 15 %.

Moreover, sub-section (4) of Section 30 of Telecommunication Act the NTA has to create a fund for development, extension and operation of the telecommunications Service in the rural area. For such fund the NTA can specify licensee to deposit such amount, every year, out of the annual income received by such operator. Yet the procedure of using such fund has not been established by the NTA formally.



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Other Related Laws are:

Screening and Registration:

In addition to receiving license from NTA, any ICT service is considered as 'service industries' thus such industry either as a firm or company has to be registered in HMG / Department of Industry.

Incorporation and Related

The Company in Nepal is formed under the Company Act, 1997 and all companies are subject to this Act. Any individual willing to form any company with the motive of earning profits may establish a company. A single promoter could promote Private Company but for public limited company the minimum number of promoters is to be seven. Any foreign national, who has obtained approval according to law to establish a company by making an investment in Nepal, may form a company. Equity investment to foreign national is permitted up to hundred percent. Shares of such company may be traded to local or foreign national, with prior permission of the Department of Industries.

Building and Related Permits:

Any industry is not permitted to construct its factory inside the ring road (inner circle) within the Kathmandu valley. But such limitation is not imposed upon service industries which includes telecom / information services. Except inside the ring road and in other parts of the country permission should be obtained from local government to construct any factory or building even for industrial purpose. However, in normal practice Village Development Committees do not ask to submit detail plan before granting the permission but in some cases it is found that those VDCs within the Kathmandu Valley have strict regulation regarding any constructions whether it is for dwelling purpose or other.

Before finalizing any construction sight it is advisable to verify whether it comes within the jurisdiction of specific Town Development Committee, which may have zoning restrictions.

Land

Certain limitation over purchase of land is imposed by ' Land Related Act, 1964. It has limited maximum area of land permissible to owned by any individual or company. Such ceiling of land could be exempted by decision of HMG/N if any industry justifies HMG/N about need for such additional area of land. Some of tea estates, agriculture farms, horticulture farms, Animal Farms, Sugar Factories, Agro-forestry industries, Hotel and Resorts are receiving such exemptions by HMG/N at time to time.

Any company or firm registered in Nepal, can purchase, own and sell land within the given limit. Land can also be obtained in long term and short-term lease to carry out the various objectives of the company.



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Labour Laws

Employment of foreigners: If a Nepalese citizen is not available for any skilled technical post even after publishing an advertisement in national level newspapers, the management may submit an application to the Department of Labour along with the evidence of such fact for the approval to appoint a non-Nepalese citizen. In such case the Department of Labour, may grant approval to employ a non-Nepalese citizen at work for a maximum period of up to five years not exceeding two years at a time. In the specialized kind of skilled technical post, the period could be up to seven years.

The Labour Act, 1992 contains provisions governing employment in Nepal and are applicable to those enterprises employing 10 or more workers or employees. As the proposed Centres would rarely be employing 10 or more persons, the Labour Act, 1992 would not be applicable in most of such centre.

The Act also contains specific provisions for labours of different areas like, tea estates, construction, transportation, hotel, travel, trekking, adventure, rafting and jungle safari etc. There are no specific provisions for labours working in ICT sector.

The Labour Rules have detailed provisions regarding provident fund, welfare fund, gratuity, leaves and other facilities to be given to employees and workers. These provisions relate to the preferential employment of Nepalese nationals and circumstances in which non-Nepali Nationals may be employed, hours of work, public holidays, procedures for termination of employment, welfare of employees, employee grievances, wage fixing, change of enterprise ownership and closure of business operation. There is a separate Tea Estate Labour Rules, 1993 to govern employees/workers working in a tea estate.

Intellectual Property

Nepal obtained the membership of World Intellectual Property Organization (WIPO) in 1997. It is seriously realized that without giving adequate protection to economic right of an individual no country can take the benefit of globalization and as a result of this new Copy Right Act was drafted. This Act is being claimed that it was enacted according to the spirit of Bern Convention for the Protection of Literary and Artistic Works, Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) and WIPO Copy Right Treaty, 1996. Nepal has also asserted in June 2001 to Paris Convention for giving strict protection to intellectual property. Hence, it is believed that this Act can play a very effective role to protect the economic interest of an individual and maintain the quality of the products as well. This Act will also be a base towards making strong intellectual property regime in future.

Department of Industries is legally responsible to protect industrial property in the form of patent, design and trademark. The title of any patent, design or trademark registered in a foreign country shall not be valid in Nepal unless it is registered in Nepal. Any person willing to register patent, design and trademark in Nepal, which is already registered in foreign countries should file an application for registration in Department of Industries with



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certificates of their registration in foreign countries. Once department receives such application may register patent, design and trademark without conducting any further enquiries.

Environment

The Environment Protection Act, 1997 and the Environment Protection Rules, 1997 contains provisions for safeguarding the environment and enabling economic development and environmental conservation to co-exist. Permission has to be obtained to establish and expand those industries having adverse impact on environment and public health. There is also environmental protection council constituted under the chairmanship of the prime minister. Its role is for policy review and to provide instructions for the preparation of plans regarding environment policy and programme.

Investment Protection and Standards of Treatment

Expropriation

Industrial Enterprises Act, 1992 has protected any investment under the Act from the nationalization. The Constitution of the Kingdom of Nepal has also guaranteed that in case of any acquisition of property, compensation based upon market value will be given to the owner.

Dispute Settlement

New Arbitration Act was enacted in 1998. This Act has given the contracting parties to choose arbitration as an alternate to resolve prospective disputes among them. If the agreement has specific provision of arbitration to resolve disputes, the parties will not have any other legal option. In any commercial dispute already filed in the court, could also be referred to arbitrator, if all the disputing parties make written application to the court requesting to do so. Detailed procedures to be followed in the arbitration including execution of the award given by foreign arbitrators are also contained in the Act.

Similarly, The Foreign Investment and Technology Transfer Act, 1992 also has provision of alternative dispute resolution. If any dispute arises between a foreign investor, national investor or the concerned industry, the concerned parties shall be required to settle the dispute by mutual consultations in the presence of the Department of Industries. If the dispute could not be settled in the manner as referred above, it has to be settled by arbitration in accordance with the prevailing arbitration rules of the United Nations Commission on International Trade Law (UNCITRAL). In such case the arbitration shall be held in Kathmandu. The laws of Nepal shall be applicable in the arbitration. If any specific provision for resolving the dispute is mentioned in the foreign investment agreement such dispute will be settled accordingly.



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Exchanging and Remitting Funds

The Foreign Exchange Regulation Act, 1962 regulates the flow of foreign exchange, which applies to Nepali National and foreigner as well. The entry of foreign currency is not restricted but remittance of funds overseas is regulated to some extent. Any person having his own foreign currency account in any commercial bank can send such money outside the country as specified by the Central Bank. Central bank is the authority to permit such transfer of funds but in certain conditions commercial banks could permit such outside remittance as authorized by the Central Bank. For repatriation of foreign investment whether it is as dividends or profit made by share sale would be permitted to send the amount in foreign currency.

Competition and Price Policies

Since Nepal adopted the free market economy in early nineties do not regulate the price in the market by allowing market forces to settle the price themselves on the basis of competition. Black Marketing and other Social Offences and Punishment Act, 1975 has made some provisions to restrict malpractice in trading. Antitrust Act or any other legislation to restrict monopoly business practice has not been enacted yet. However, the needs of such legislation are seriously realized.

Tax and Customs Incentives

Industrial Enterprise Act, 1992 provides for an Industrial Promotion Board and Single Window Committee to promote and provide concessions and facilities to industry. The Act provides incentives through the tax system.

The customs duty, sales tax, excise duty and premium levied on raw materials and auxiliary raw materials utilized by an industry in connections with its products during its production shall be reimbursed on the basis of the quantity of the export.

Any industry providing direct employment to six hundred or more Nepali citizens for whole year will be give 10 percent rebate in income tax for that specific year. Any special industry operative in undeveloped, underdeveloped and relatively developed areas shall be given the 30, 25 and 20 percent rebate in income tax for the period of ten years.

Only 2.5 % of customs duty shall be levied on the import of equipment and machinery and in such cases import license fee, sale tax etc. shall not be levied. Protection against double sales tax on raw materials and products and guarantee against nationalization is also provided by the Industrial Enterprise Act, 1992.

The Electronic Transaction and Digital Signature Ordinance, 2204 has been formally promulgated and has basic provisions regarding:



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Needed Laws to promote ICT

Development of ICT could not be contemplated without promotional provision in different aspects of ICT related laws. The IT policy has clearly declared the IT as "a priority sector" (Point 5.1). Priority does not mean only written recognition as priority but other action of the state must show such commitment. Unfortunately, any of the action of the Government of Nepal does not give confidence for entrepreneur to see the IT as priority sector.

There has not been a single example, which gives such impression, though there are some which give the opposite. For example a banker (as service industry) will have to pay the government income tax if he makes any profit, and does not need to pay any additional tax, but any Telecommunication Service Provider in Nepal has to pay additional 4 % of the income (not profit) whether he make any profit or not. Additionally 2% of gross income is being levied as amount for rural telecommunication development. The section 34 of the Telecommunication Act has some provision for exempting such services from some taxes and duties but practically no such step has been taken.

In Nepal, to promote the ICT services new legislation should be enacted to address following areas:

- Providing some incentive and concession to small entrepreneurs serving rural population.
- Rationalization prevailing taxation system and, specific tax holiday for ICT industries,
- Reduction in tax rate if the income is reinvested in the industry itself,
- Special facilities for industries providing job opportunities for more than specific numbers of people,
- Special facilities for academic and training institutes providing training in IT related areas.
- Allocation of national budget to be distributed to private sector R&D organizations conducting R&D in IT sector.

ICT sector could not be considered as isolated area. For appropriate use and regulation and promotion of ICT in addition to core legislation it is necessary to make changes in other ancillary laws. In some area new legislation could also be welcomed. In Nepalese context list of such laws could be as follows:

- Contract Act - (should accept electronic document, conduct of proposing and accepting as contract)
- Laws related to IPR. The New Copy Right Act 2059 is already enacted, but it should be amended in an appropriate way to make the investors more secure about their investment. Prevailing, Patent, Design and Trademark Act is ineffective and incapable to address the contemporary issue, thus should be repealed by new Act.
- Consumer Protection Act shall also be made to cope with ICT services.



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- All laws related to telecommunication should be rationalized with a view to promote ICT.
- Public Nuisance Act (Deterrence and Punishment) should also be amended to address nuisance in the net.

One of the areas of concern would be jurisdiction. Most of the communication and transactions made through IT would have international nature. Therefore, for any kind of infringement or violation of laws, question of jurisdiction and enforceability may arise. Therefore, most of the related laws should have EXTRA-TERRITORIAL jurisdictions. Moreover, Nepal must try to enter in bilateral or multilateral treaties with other countries for successful implementation of concerned laws.



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ANNEX 6: Taking stock of telecentre movement in Nepal

Executive Summary

The piloting of telecentres in Nepal over the last two years has generated important lessons and insights that could shape the strategic direction of future such initiatives in the country. The key lessons learned and insights gained through these pilot initiatives can be summarized in the following manner:

- there is a great deal of enthusiasm to support and promote telecentres at the community level. The establishment of telecentres must accompany regular information mobilization initiatives whereby participating communities are mobilized to exploit ICTs to meet local development needs.
- the rollout of telecentres should be accompanied by judiciously designed development and business models that create digital opportunities involving development and deployment of content, services and solutions that cater to local needs and requirements
- implementations that sought to capitalize on interactivity attributes of ICTs (for example internet and email) faced challenges at most of the rural and peri-urban areas due to poor quality of communication infrastructure resulting in painfully slow connections, absence of local ISP's resulting in increased connectivity costs and lack of technical backstopping support. Strategies must also therefore be in place for exploiting resourcefulness of ICTs when off-line.
- over dependence in landline based dial-up connectivity for telecentre rollout excludes many potential areas where telecentres could generate real value to the communities
- policy provisions must be in place in order to ensure proliferation of ISPs outside key urban areas
- telecentres require handholding support for at least a period of 1.5 years during which efforts should be mounted towards bringing them to a level of maturity where the participating communities are gradually prepared to fully own and sustain the initiatives. This should be supported by a well thought out phased exit strategy with embedded mechanism for building capacity of participating community so as to ensure smooth operation and sustainability of telecentres after the withdrawal of external support. A detailed plan of action with well articulated objectives, activities, milestones as well as monitoring and evaluation mechanisms must be developed and pursued during this period. Efforts must be undertaken to develop resources (manuals, guidelines etc) to support sustainability of telecentres beyond the period of intensive support.
- overall security situation must improve in order to ensure success of any initiatives aimed at expanding rural connectivity. It must however be noted that telecentres have not been directly targeted so far by the insurgents. The locking-up of some VDCs where some telecentres were located by insurgents have forced the closure of some telecentres. There is also a case of security forces removing telecom connectivity to a telecentre located in Parbat districts fearing use of the same by insurgents.



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- VSAT based implementations must be accompanied by a sound business model involving the establishment of multiple nodes covering sizable user base that so as to ensure sustainability of such implementation
- conducive policy provisions must be in place to bring down the connectivity charges to an affordable limit (for example, treating all calls made to ISP's by telecentres as local calls, tax breaks and like to rural ISPs)
- all strata of the society must be represented in telecentre users committee. This requires proactive responses on behalf of all concerned so as to influence the composition of such users committees. There has been low level of participation of women and dalits in telecentre users committees formed so far
- a central level institutional mechanism with clear mandate and mission to coordinate, facilitate and support telecentre related initiatives undertaken by various agencies must be formed. Such an outfit would be desirable from the perspective of forging alliances among various actors engaged in bridging digital divide in the country. As development of properly aligned digital content falls under domain of various line agencies(for example health, education and agriculture extension, etc) , one of the key roles of such an outfit would be to work as an advocacy and policy support platform to motivate line agencies to develop strategies for capitalizing on the reach and resourcefulness of telecentres.
- apart from local beneficiaries and community members, local level development workers, government extension workers, teachers and NGO's could also be target beneficiaries of the telecentre
- school children stand to benefit substantially from access to telecenter resources
- opportunities exist at the local level to workout public-private partnership arrangements for the establishment and operation of telecentres
- mechanisms and advocacy thrust must be deployed to encourage research and development on reducing barriers to ICTs (for example, development of easy PC interface for the ones with low level of literacy and exposure, research in the area of alternative sources of energy to power computer equipment and peripherals, development of mechanism for continually monitoring local information and communication needs, developing solutions for harnessing digital means to capitalize on local opportunities and prospects, etc)



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1 BACKGROUND

Initiatives aimed at establishing telecentres as an effective means of bridging digital divide and helping catalyze local development process in Nepal can, at best, be categorized to be at its most formative stages. Even though IT policy announced by His Majesty's Government in the year 2000 envisaged to adopt telecentre approach as one of the ways of bridging digital divide and expanding access to ICTs to the people living in rural and remote areas of Nepal, no concrete initiative in this regard emerged until the beginning of the year 2002.

ICTs for Development - NEP-02-008- a joint initiative of His Majesty's Government of Nepal, Ministry of Science and Technology and United Nations Development Programme (UNDP) which came into existence in the month of August, 2002 marks in earnest the beginning of strategic and systematic efforts aimed at exploring the prospects of harnessing ICTs for development and poverty reduction in line with the vision adopted by national IT Policy and strategy.

Key agencies engaged in establishment of telecentres in Nepal

- ICT for Development
- United Nations Development Programme/ Ministry of Science and Technology
- Ministry of Science and Technology
- National Information Technology Centre (NITC)
- United Nations Development Programme/ SPPD-RUPP
- High Level Commission for Information Technology, His Majesty's Government

Table 1: List of telecentres established by ICT for Development and Ministry of Science and Technology/ NITC

District	VDC covered	Responsible agency	Type of connectivity
Parbat	Katuachaupari	ICT4D	Dial-up
	Manjphant	ICT4D	Dial-up
	Milanchowk	NITC/MoST	Dial-up
Sunsari	Singhiya	ICT4D	Wireless
	Dumraha	ICT4D	Wireless
	Madhesa	MoST	Wireless
Okhaldhunga	Okhaldhunga	ICT4D	VSAT
	Rumjhatar	ICT4D	VSAT/Wi-Fi
Mustang	Jomsom	ICT4D	VSAT
	Marpha	ICT4D	VSAT
	Tukuchey	MoST	VSAT
	Kobang	HLCIT	VSAT
Kathmandu	Bungmati	ICT4D/ PPP arrangement	Dial-up



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Even though Ministry of Information and Communication has been active in the area of expanding telecommunication connectivity to rural areas of Nepal, the basic ambit of such an initiative has not extended beyond provision of predominantly voice based connectivity which nonetheless represents enormous utility value to the communities given poor telecommunication footprint in the country.

The efforts of ICTs for Development were also complemented by Development Information and Rural Access Project (NEP/03/M04) - which in essence was a 'sub-project' operating under ICTs for Development supported by UNDP/TTF. Telecentres with VSAT connectivity to Nuwakot and Okhaldhunga districts were piloted through this project. In addition, the project also developed a framework of Development Support Information System as part of creating a digital repository of documents, reports, research studies and reference materials relating to poverty reduction and sustainable development in Nepal.

In total 8 telecentres were established through ICTs for Development and Ministry of Science and Technology (NITC) at locations indicated in Table 1. These include some interesting VSAT/Wi-Fi based implementation in some locations.

Table 2: List of telecentres established by UNDP-SPPD/UN-Habitat/RUPP

Municipality	Ward/VDC covered	Type of connectivity
Butwal	Ward # 15	Dial-up
	Khairani RMC	Dial-up
Hetauda	Bhimphedi RMC	Dial-up
Pokhara	Ward # 18	Dial-up
	Dulegaunda RMC	Dial-up
Nepalgunj	Ward # 1	Dial-up
	Kohalpur RMC	Dial-up
Biratnager	Ward # 11	Dial-up
	Rangeli RMC	Dial-up
Tribhuvannagar	Baluwang RMC	Dial-up

In addition to above, UNDP supported and UN-Habitat executed study on "Assessing feasibility of ICTs as an instrument of development in Nepal (SP-NEP/02/002)" also included a piloting component entailing establishment of 8 telecentres in municipalities and Rural Market Centres where Rural-Urban Partnership Programme (RUPP- NEP/02/002) were been implemented. Apart from this, there has been significant upsurge in number of privately owned internet kiosks (popularly known as *cybers*) throughout the urban areas of Nepal where basic enabling infrastructure exists. Riding on ever increasing popularity of internet and ease of communication obtainable through electronic mails, these *cybers* are playing crucial role in diffusing ICTs to the masses even though they are completely commercially oriented and do not have so much of development orientation.



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2 THE SUSTAINABILITY CHALLENGE

In a society where infrastructure, affordability and skills continue to be the key issues that lie at the core of the factors determining ICT diffusion and usage, community owned telecentres operating largely within the premise of mediated flow of information and provision of related services hold the prospects of providing an effective mechanism of expanding access to the benefits of ICTs to the people living in remote and rural areas of Nepal. This should also be seen in the context of prevalent gaps in the delivery of public information and services as a significant proportion of the population continues to live isolated on the margins of national mainstream.

The results of Nepal's efforts aimed at establishing and sustaining telecentres so far have however fallen significantly short of meeting broad developmental targets that such telecentres initially envisaged to meet. A complex interplay of issues relating to poor project implementation, relative novelty of concepts and approaches, lack of distinct development orientation, grossly inadequate and poor physical infrastructure and ever challenging security situation resulted in poor performance of telecentres in Nepal. It has also been realized that the established telecentres were not given the kind of handholding support required for them to acquire a level of maturity before expecting the participating communities to fully own them and ensure their sustainability through indigenous means. For example, financial and technical backstopping support to telecentres was provided on an average from only six months to one year after which they were expected to fend for themselves. Sustainability and local ownership become challenging propositions until communities are facilitated to ensure social appropriation of such telecentres so as to create definite value to the communities. And value creation remains contingent upon a) relatively robust communication infrastructure that effectively facilitates interactivity attributes of ICTs and b) a well thought-out strategic mix of resources that create conditions for effectively leveraging ICTs to meet local communication and information needs.

Promising signs.....

Parbat – The outbreak of foot and mouth disease among the livestock in Katuachaupari VDC and adjoining areas caught the local agriculture extension worker unawares as he did not have sufficient information and knowledge on as to how to deal with the situation. This brought the extension worker to the local telecentre where he was able to download information on the disease through the web site developed by ICTs for Development. In this way, he was able to provide initial response to the outbreak while working towards developing strategies for checking the spread of the disease.

In Milan Chowk of Salija VDC, the community members were exposed to significant utility value of telecentres when the results of School Leaving Certificate (SLC) examination were published by the SLC board in early June. As compared to the situation where one had to wait for days to find out the results, the SLC students and their guardians could check their results in telecentre within hours that they were published. The downloaded results were posted on the notice board of the telecentres much to the relief of guardians and students.

Apart from few initial instances of value creation as illustrated above, the telecentres have also been used to disseminate agriculture commodity market prices prevalent in various markets made available in the internet through Agro Enterprise Centre/ FNCCI.



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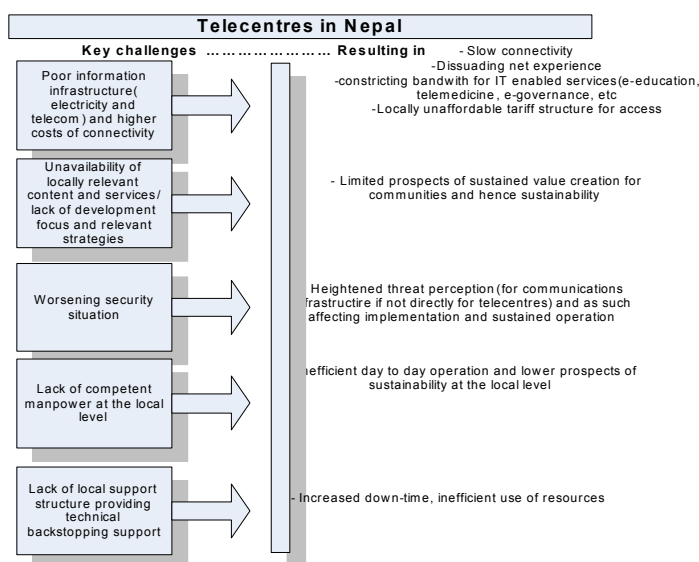
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As a result, most of the telecentres established during last two years have either remained less effective for want of more resources, presence of challenging security situation and technical backstopping support or are experiencing operational problems associated with inefficient infrastructure (for low bandwidth, irregular supply of electricity, etc). Few of them (specially the ones in Milan Chowk Parbat, Dumraha Sunsari, 2 VDC's of Okhaldunga, and 1 in Nuwakot have maintained satisfactory level of operations). The other thing that must be taken into account is the fact that these telecentres remain spatially dispersed 'pilot' interventions devoid of significant network benefits that properly deployed ICTs can bring about.

The fact remains however that these pilot interventions have nonetheless generated important lessons, which could pave the way for formulating future strategies for effectively deploying ICTs for development and poverty reduction. More significant perhaps is the realization in terms of lessons learned that connectivity and access to ICTs alone, though important, do not automatically translate into significant value creation for the intended beneficiaries in terms of clear developmental and poverty reduction outcomes. As far as poverty reduction and ICTs are concerned, the interrelationship continues to be complex and largely remains an unrealized potential. This underscores the need to strategize telecentre rollout beyond provision of physical infrastructure and connectivity and factor in the issues of proper *operational mechanism/institutional arrangement and contents, ICT enabled solutions and services aligned with local needs and opportunities*. Viewed from this perspective, the most effective models of telecentre diffusion are likely to be the ones where ICTs are embedded into clearly defined developmental strategies.

All said, the fact remains however that access - defined holistically in terms of all its concomitant attributes - and connectivity continue to be the basic elements residing at the core of wide scale ICT diffusion at the community level. And properly deployed telecentres do present a cogent model for ICT diffusion at this level.

Fig 1 : Challenges faced by telecentres



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Based upon the experience and insights gained so far, telecentres in Nepal have to be analyzed against a backdrop of a challenging environment as depicted in Fig 1. As it is, the overall readiness for effectively launching and sustaining telecentres remains inadequate in Nepal. In the absence of enabling infrastructure like basic telephony in most of rural areas to the scale that would allow national roll-out of such telecentres, data-grade telecom infrastructure seems to be the crucial requirement that needs to be addressed. Even though alternative technological solutions like VSAT can be considered, this entails relatively higher cost of establishment and operation with attendant technological complexities that will be difficult to handle at the local level on a sustained basis unless such implementations are backed by well thought-out support mechanism and business models. Then there is also a question of overall cost of connectivity. At an estimated cost of Rs 27/hr for 1 hour of Internet usage¹⁹, access still remains unaffordable to an average Nepali. This situation is further compounded by lack of Point-of-Presence of ISP's outside Kathmandu and major urban areas resulting in ever more costly dial-up connectivity.

3 LESSONS LEARNT

Lessons learnt and experience and knowledge gained and through the telecentre related activities in Nepal so far can be grouped in the following categories:

3.1 E-Readiness

Development interventions aimed at diffusion of ICTs at the community level is at times an interplay of paradoxes of sorts. While most intervention decisions in development parlance draw their theoretical underpinnings from more or less *proven* development models that promise to ensure return on investments, avoid expensive learning curves and reduce chances of failure, initiatives aimed at leveraging ICTs to address local development and poverty reduction challenges are based on the promise of 'yet-to-be-proven-potentialities' that these technologies are *theoretically* 'capable of' offering specially in a country like ours. Notwithstanding the fact that information and knowledge taken together are increasingly becoming in essence a fourth factor of production and value creation in a globalized world, 'context' continues to retain its relevance in wide scale ICT diffusion in a society like ours.

A deeper analysis of factors that shape the likelihood of success or failure of an ICT diffusion strategy reveals whether a particular society is 'ready' to harness ICTs to meet its developmental objectives. Issues surrounding the roll-out of telecentres in Nepal should also be viewed within this context. From the perspective telecentre roll-out and role of ICTs as instruments of development, the following constitute key elements of e-readiness:

Lessons Learned

- Quality and outreach of infrastructure is remains inadequate
- Local technical support not available
- Skills level of telecentre staff remain inadequate to ensure operation on a sustained basis
- Content and services aligned to local needs not available

¹⁹ Estimation based on non-ISD connectivity as well as prevalent ISP charges



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- i) type and availability of basic physical infrastructure (telecommunication and electricity)
- ii) level of literacy and education of target beneficiaries
- iii) location specific connectivity charges
- iv) presence of supporting institutions (technical service providers, content developers, etc) and
- v) level of enthusiasm and commitment shown by the communities

In terms of lessons learned, the telecentre implementation, has become relatively easy at locations that offer:

- a) basic infrastructure in terms of electricity and telecommunications (telephone connectivity for dial-up access) dependable quality of service of such infrastructure
- b) conducive demographic make-up of the population in terms of level of basic education and literacy among participating communities (for example urban and peri-urban areas)
- c) affordable cost of connectivity owing primarily to the presence of local ISP and
- d) the presence of mobilized (CBO's and Tol/Lane Organizations) enthusiastic and willing communities

Lessons Learned

- The level of involvement of local government outfits should be held in such a way so as to circumvent bureaucratic delays in recruitment and other activities
- Trying to run a telecentre with volunteers is problematic at least until such time when telecentre starts generating value to the users
- Handholding institutional support would be required for at least one year
- Full involvement local NGOs in telecentre operation and management could be viable option

3.2 Operational Modality

Operational modalities and institutional mechanism adopted for the establishment and operationalization of telecentres in Nepal have been primarily guided by the need to ensure community ownership and devise a sustainable strategy for telecentre operation and management. Table 3 depicts institutional arrangements for implementation of telecentre related activities adopted by various actors in this area.

Table 3: Institutional arrangement

Programme	Institutional arrangements	
	At the central level	At the local level
ICTs for Development	Programme launched through MoST/UNDP	MoU signed with respective DDCs for programme implementation
MoST/NITC	National Information Technology Centre	MoU signed with respective DDCs for programme implementation



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Programme	Institutional arrangements	
	At the central level	At the local level
UNDP-SPPD pilot	Programme launched through RUPP Telecentre Users Committee	MoU signed between partner municipality and Rural Market Centres (VDCs) and UNDP-SPPD

3.3 Security Concerns

The sustained spell of insurgency that the country has been forced to endure has been having an adverse impact on all sectors including economy and development. In fact security issues combined with overtly palpable threat perception have been some of the key factors that have impeded the growth and development of telecentre movement in Nepal. Most of the locations identified for telecentre establishment both by ICTs for Development/ MoST/NITC and SPPD-UNDP pilot initiatives are by and large locations reeling under ever deteriorating security situation. Given the strategic nature of information and knowledge and hence the tools and contraptions that facilitate their diffusion, security concerns do come into the picture while contemplating roll-out of telecentres.

Lessons Learned

- In view of limitations associated with full-fledged internet connectivity, additional revenue streams in the form of photocopier, etc required
- Local hardware and technical backstopping support not available resulting in extended down-time
- In absence of solutions and services aligned with local needs, value creation and subsequent usage is low affecting sustainability
- Users Committee ensure community participation in telecentre operation and management

3.4 Sustainability issues

As stated earlier, telecentre sustainability is a complex issue having several dimensions as depicted in Fig. 2. As sustainability in its entirety is intrinsically tied up with the value that telecentres offer to its users, it will be erroneous to think only in terms of financial sustainability. Rather, overall sustainability of telecentres need to be analyzed within these dimensions:

Lessons Learned

- Though none of the established telecentres have been directly targeted so far, heightened security concerns impede implementation
- Sabotage of telecom infrastructure has adverse impact on telecentre operations

i) Level of value creation to the communities

The importance of telecommunication in a country like ours where a sizable population remains isolated due to geographical impediments cannot be over-emphasized. This explains the immense popularity of telephones and for that matter, all other forms of communication technologies. At its most basic level, ICTs and their institutional embodiment in a telecentre offer effective means of communication and hence constitute single most utility value to the users who are deprived of such access. The fact remains however that provision of communication facility alone, though immensely valuable, will not adequately meet overall



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development objectives with which telecentres are promoted and established. Effective and productive utilization of telecentres is essentially a factor of as to what extent community members are able to leverage this important infrastructure to improve their situation. This entails a strategic framework of telecentre usage whereby content and services that are delivered through telecentres define total value created for the users of the telecentres.

Experience gained thus far points more strongly to this lacuna in development objectives of the telecentres and the extent to which content and services that are available through them are aligned with such objectives. This means that except in places where the establishment of telecentres have provided basic telecom connectivity where non existed and thus created immense value to the users, total developmental value generated through telecentres remains low thus far.

ii) Operation and management

Telecentres in Nepal are having to function under a challenging environment. From the perspective of sustainability, internalization and community ownership, best model of their operation ideally have to be grounded on an institutional structure where participating communities are geared towards totally owning the initiative and committing local resources to run the telecentres. However, given a scenario where telecentres have yet to prove their value to the communities, any expectation on the communities to fully own the telecentres with matching resource commitment becomes by and large unrealistic at least during the initial stages of their establishment (for example, for a period of at least a year after establishment).

Staffing arrangements and exit strategy

The piloting of telecentres by ICTs for Development and MoST/NITC were implemented at the field level in conjunction with respective DDCs. Staffing arrangement under this initiative included recruitment of paid staff to run the telecentres. In case of SPPD-UNDP/RUPP pilot however, volunteers were assigned by the Telecentre Users Committee to run them on a regular basis and trained to provide mediated access to telecentre resources to the communities.

The idea of linking telecentre with DDCs is basically guided by the fact that DDC are key local government outfits headed by elected officials and are thus key agency responsible for the development of concerned district. From the perspective of gearing up DDC's to progressively embed telecentres within their development mandate, the partnership between MoST/ICT4D and DDC's seemed to rest on sound theoretical footing. Challenges were however encountered specially during the staff recruitment process for telecentres as DDC's have their own unique mechanisms in place with regards to recruitment which is unfortunately characterized by bureaucratic delays and inflexible regulatory framework and therefore probably not suitable for recruiting telecentre staff who are basically temporary staff subject to phased exit strategy pending total ownership of telecentres by users committees and have to function under decidedly service orientation rather than typical government employee mindset.



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Based upon this important lesson learnt, even though involvement of DDC's in telecentre rollout appears theoretically desirable, the primary responsibilities of operation and management of telecentre and hence recruitment should however rest completely on Telecentre Users Committee where respective VDC will also be represented. This arrangement will ensure community ownership and enhance the prospects of sustainability of the telecentres.

Experiences also show that the idea of running telecentres with volunteer staff is also doubttable proposition in our context - at least during initial stages of telecentre establishment. As the telecentre operation and management requires mixed set of competencies in the person managing the outfit, this very attribute ironically makes his/her retention for over a longer period of time difficult. This implies that steps need to be taken to ensure that basic conditions exists for telecentre managers/ operators to remain committed on the job and also, contingency strategies are in place. This underscores the need to continually engage in training activities to identified interested candidates, specially from among local youths and reasonably qualified housewives who are likely to be less mobile. This obviously adds to recurring operation and management costs of telecentres, which must be factored into overall national rollout strategies for telecentres.

4 SUGGESTED FRAMEWORK FOR NATIONAL ROLL-OUT OF TELECENTRES IN NEPAL

The national roll-out framework for telecentres in Nepal can be based analyzed on the basis of 3 dimensions:

4.1 Enabling factors

4.1.1 Infrastructure

If one has to single out one key element that is most likely to impede the growth of telecentres in Nepal it would be infrastructure. As it is, 61% of total population of Nepal are deprived of electricity²⁰ as a source of energy. Even though in some places where electricity is available (particularly in some rural areas), the supply is discontinuous and of sub-standard quality beyond tolerance limit of most of the computing equipment. Same is true with telecommunication connectivity. Tele-density still remains low with stark imbalance in favour of urban areas (.178% in rural areas as opposed to 17% in urban areas²¹). Specially in rural areas, even when connectivity is available, the overall quality remains low resulting in painfully, and at times, nearly impossible connection to the net – thereby severely limiting any practical and meaningful use of internet, and more importantly resulting in dissuading internet experience for the users. On top of this, many of the exchanges do not support data communication.

Key dimensions of National roll-out

- **Enabling factors**
 - Infrastructure
 - Policy framework
- **Institutional arrangements**
 - Macro-level
 - Meso-level
 - Micro-level
- **Strategies for value creation and sustainability**
 - Content and services aligned with community needs
 - Telecentres as community knowledge centres

²⁰ Mapping population indicators of Nepal, HMG-CBS/ICIMOD

²¹ Nepal Doorsnacher Company Limited, 2004

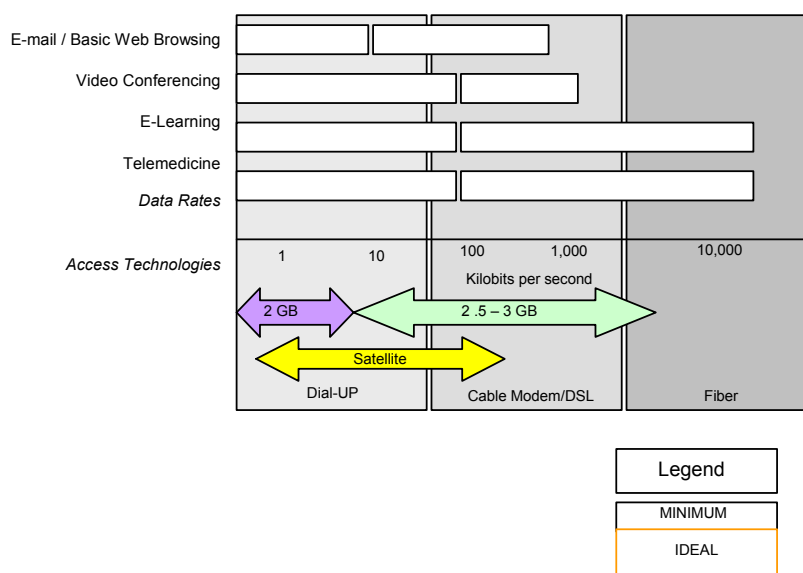


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Fig 2 Analyzing bandwidth requirement Speeds & Capabilities



Dial-up connectivity is still the choice for connecting to the internet which, to a considerable extent, limits the scope of enhanced value creation to the community through this medium in the form of a host of IT enabled services (distance education and telemedicine, for example) tailored to the specific needs of the communities. As it is, such applications can only be feasible in the presence of robust infrastructure that offers high bandwidth for communication.

Fig 2. depicts bandwidth requirement for key applications and technologies that are currently available. The intention here is not to totally play down the benefits offered by dial-up connectivity. If not high-end, multi-media content, basic application and services can be delivered through dial-up connectivity with reasonable speed (say 25- 40 kbps). And as compared with broadband implementation, dial-up connectivity are extremely cheap and affordable. However, if ICTs have to have transformative potential to the scale envisaged, the issue of bandwidth along with availability of 'killer applications' becomes an important factor that can not be ignored in eventual rollout of telecentres.

In some of the locations where basic telecom access is not available, ICTs for Development has implemented interesting VSAT based implementation as provided at end of this document. However, at total operating cost of nearly US\$ 1000 a month (for VSAT + IP access) these have turned out to be expensive implementation at local context. For locations, which lack basic telecom access, the installation of these equipment has nevertheless generated immense value to the communities which can not be compared perhaps on dollar terms. But sustainability will continue to be an issue. Initial results have shown that with further expansion of network (expanding the connectivity to few more VDC's, for example), the costs involved could be spatially spread in order to bring whole initiative to a sustainable limit.



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Discussions on telecentre rollout on a scale envisaged should therefore be optimistically based on assumptions that policy instruments that are in place in improving the telecom sector and expansion of electricity network would progressively address challenges outlined above. And there are reasons to believe they will -for example, the liberalization of telecom sector has already started to show results which is likely to get better with time.

All this points towards a number of factors that need to be considered in order to ensure that telecentres do meet intended objectives and serve overall purpose of national rollout. As such, the national any rollout scheme must be guided by the following considerations:

Elements of conducive policy framework

- Public sector commitment to leverage telecentres as a means of extending outreach of public sector information and services
- Creating environment for expansion of ISPs to cater to rural and underserved areas
- Tariff rebates on equipment meant for telecentres
- Bringing connectivity charges to a affordable limit through affirmative actions like treating dial-up calls to ISPs as local calls irrespective of their geographical locations

4.1.2 Policy framework

Appropriate policy responses would be required to form a sustained basis for national rollout of telecentres. For example, favourable policy provisions would be required to ensure that ISP extend point-of-presence to serve rural and underserved areas. In order to bring dial-up connectivity, policy decision could be taken to treat all calls originating from designated telecentres to designated ISPs as local calls irrespective of the location of telecentres. Similarly, the prospects of lowering tariff structure on hardware and software purchases made for use of telecentres also needs to be explored. More important perhaps is the policy commitment to harness digital means to meet public ends. Along these lines, ICTs in general and telecentres in particular must be treated as a cross-cutting theme so that they become vehicles for expanding outreach of government information and services.

4.2 Strategy for value creation and sustainability

4.2.1 Contents and services aligned with community needs

From the perspective of the potential of ICTs in development and poverty reduction, the issue of value creation through telecentres to the target communities is a central issue. Simply put, it is important to know as to why a common community dweller would go to a telecentre? What meaningful, substantive value would he or she derive from the access to telecentre and its resources? From the perspective of development and poverty reduction, do ICTs in general and telecentres in particular have transformative potentials as claimed?

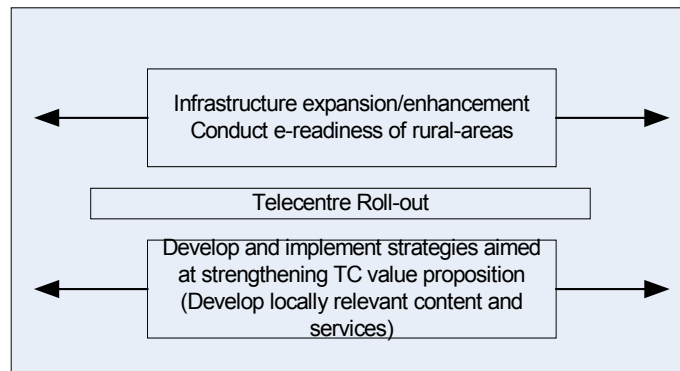


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Fig. 3: Guiding principle for roll-out of telecentres



Though sounding simple and obvious on the face of it, this is nevertheless a complex issue. Theoretically, expanded access to ICTs translate into expanded access to knowledge and information which in turn provide productive inputs to individual growth and local development and poverty reduction initiatives. But is it that straightforward?

Taking internet connectivity as a key attribute of telecentre, the pattern of internet usage even in cities where literacy level are relatively higher suggest large portion of it to be in favour of activities that do not normally add substantive value to the user in the conventional sense. For example, empirical evidences show that most of the young users have a tendency to use substantial portion of their on-line activity to swap music files and engage in internet based chatting which can at best be termed as entertainment related activities and not knowledge enhancing ones. This again underscores the need to think beyond the provision of physical access to ICTs as being single enabling element to its productive usage - and think in terms of ways and means that could shape productive utilization patterns of these important resources.

This is where the need to explore the prospect of embedding ICTs into individual and collective economic and productive pursuits come into prominence. For example, internet usage pattern in youngsters are likely to change substantially if their curriculum is based on knowledge and research intensive activities, writing essays and conducting internet based researches in some thematic areas tied up with main curricula.

In case of communities too, to create value, ICTs must be embedded with activities that enhance their capabilities and expand range of choices. For example, leveraging internet to disseminate market price information on agricultural commodities, harnessing interactivity attributes of ICTs to help bridge gaps in basic public service delivery in areas of education, agriculture extension and health. This implies that telecentre roll-out must either precede or at least go hand in hand with activities aimed at creating values to the users (ref . Fig 4).

Obviously, this issue is also tied-up intrinsically with sustainability of telecentre and the level of commitment from the community to sustain such initiative. In this connection, telecentres are to be viewed as an important infrastructure (at par perhaps with roads and electricity). As it is, developmental results are best obtained when communities are *capable* of exploiting



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these infrastructures to their advantage. For example, provision of electricity and road access can only translate into definite economic and development gains if local communities are able to engage in local trading and production activities that could make optimum utilization of these infrastructures. Same holds true with regards to telecentres. Viewed from this perspective, the mere provision of physical access to ICTs does not automatically translate into far reaching development and poverty reduction implications. For wider impact to be created, telecentres must be able to generate value to the communities which in turn is essentially i) a function of as to the extent the participating communities are capable of leveraging telecentres to their advantage and ii) the extent to which contents and services that are designed to meet community requirements are available through such telecentres.

The following constitutes key elements of value creation through telecentres:

- i. awareness about the importance of information and knowledge, their linkages with development and poverty reduction and ICTs as a medium facilitating the same
- ii. mediated flow of information thereby overcoming common barriers to access like literacy level, technical skills and affordability
- iii. formulating proactive responses to information, knowledge and communication needs of the community under a technology neutral framework
- iv. developing strategies for bridging gaps in public service and information delivery

From the perspective of national rollout of telecentres, all this points towards the need for coordinated action on part of government agencies, NGOs and INGOs to develop strategies aimed at leveraging telecentres as an additional means of meeting local development needs. For example, Department of Health or other related institutions, while considering health service outreach programme, could factor in the potential role that telecentres could play in making such programmes more effective and address this in their overall strategies. Same goes with agricultural and education services.

National roll-out of telecentres should therefore be considered as a cross-cutting intervention involving key development actors in some form or the other. This of course will not happen on its own and would rather require an institutional leadership that coordinates involvement of key actors backed by firm policy commitments to create combined value to the users of telecentre, namely the community members. The defines the context for institutional arrangement for national roll-out of telecentres as depicted in Fig 5.

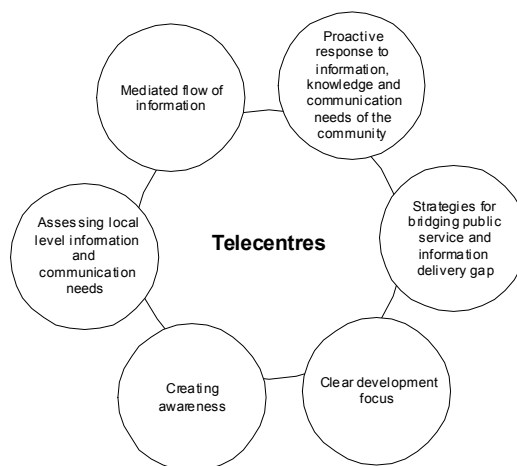


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Fig. 4 Value creation through telecentres



4.2.2 Telecentres as community knowledge centres

In order ensure that telecentres serve development and poverty reduction objectives, it will be important to view telecentres beyond purely technological frame of reference. Ideally, they should be regarded as community knowledge centres where ICTs serve only as a means of knowledge acquisition and dissemination. Viewed from this perspective, telecentres should draw knowledge and information from any source available and be able to workout a dissemination strategy.

4.2.3 Sustainability issues

Sustainability continues to be a key issue in telecentre operation and management and a complex one at that. At the bottom of it, sustainability with regards to telecentres has three dimensions:

I. Financial sustainability -

includes telecentre operation and management costs, connectivity, utility and logistics costs

II. Technical sustainability - technical backstopping support and arrangements to ensure smooth and trouble free operation of telecentres

III. Social sustainability - the sustained ability of telecentres to generate value to the communities

Addressing Financial sustainability:

- To the extent possible, ensure optimum resource mix (for example, photocopier and digital camera in addition to PCs)
- Marketing creativity employed (for example, steps taken to increase users base - providing membership to schools and NGOs, providing e-mail delivery services to local businesses, selling commonly used government forms – citizenship, passport, land revenue etc through telecentres, maintaining VDC records for a small fee, etc)
- Proper costing of services – Designing service tariff structure based on actual cost of delivering a particular service and mark-up needed to support sustainability of operations



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Fig. 2 depicts key elements of telecentre sustainability. These elements of sustainability must be factored into any telecentre roll-out strategy.

I. FINANCIAL SUSTAINABILITY OF TELECENTRE

Financial sustainability of telecentre is one of the most crucial issues in telecentre operation and management. From the perspective of national roll-out, financial sustainability is an issue that needs both macro as well as micro level treatment. At the macro level, sustainability is intrinsically tied up with connectivity as well as hardware and software costs. Policy provisions to lower connectivity costs as well as hardware and software costs specifically for the telecentres need to be considered.

The issue of proper mix of telecentre resources also has direct bearing on the financial sustainability of telecentre. For example, the addition of a photocopier as well as a digital camera add additional revenue stream that could enhance resourcefulness of telecenter and support in its financial sustainability. A full-fledged multimedia telecentre has better chances of sustaining itself specifically in semi and peri-urban areas.

Telecentres must have resources at their disposal to ensure smooth operation, provide for regular maintenance and overhead and finance future growth and upgrades. Viewed from this perspective, best model of financial sustainability is achieved when telecentre is held as a business entity, which has to survive through its own means. This underscores the need to draw up business plan for telecentre establishment. Business plans, drawn up by the communities for each and every telecentre provide important pointers to major cost and revenue centres within telecentre operation.

II. TECHNICAL SUSTAINABILITY OF TELECENTRES

During field visits it is a common observation to see computer equipment lying idle for lack of proper maintenance and care. This situation is particularly attributable to two reasons: i) lack of local hardware support and ii) lack of basic, primary skills required ensure regular preventive maintenance of the equipment. The situation will even be more challenging at VDC levels where local maintenance support will be almost non-existent. Arrangements must be in place to ensure technical sustainability. This can be achieved through thoughtfully worked out preventive maintenance contracts and by building local capacities for primary preventive maintenance and support (through specialized training to local technicians, for example).

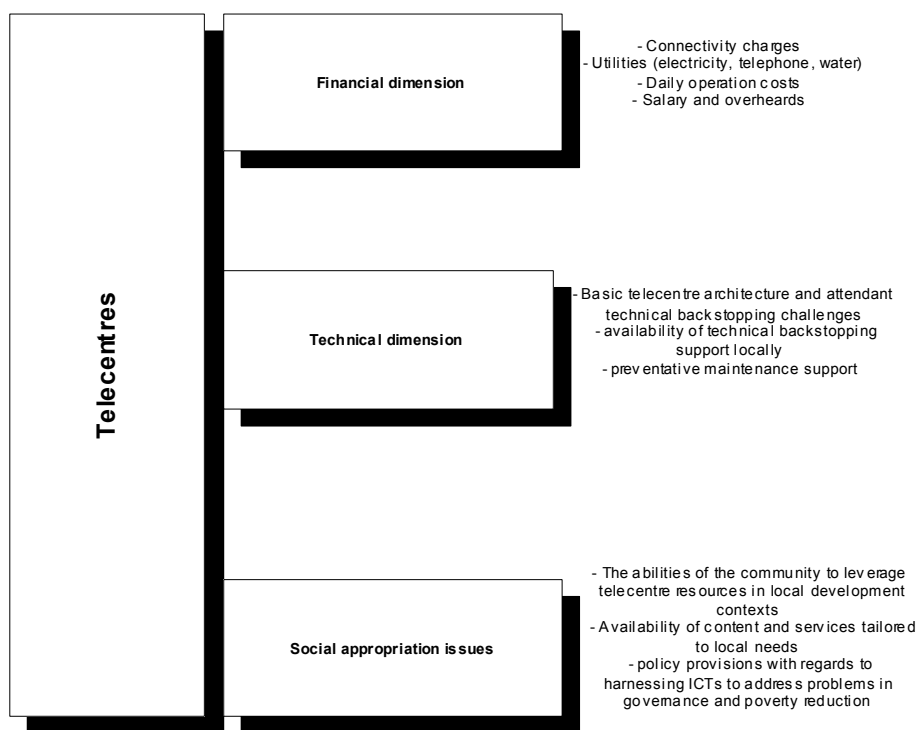


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Fig 5 Dimensions of Telecentre Sustainability.



5 THE ROLE OF EXISTING TELECENTRES IN FUTURE NATIONAL ROLLOUT

The status that the current telecentres are in will have a direct bearing on the national roll-out of telecentres. The sudden withdrawal of support to existing telecentres that have yet to acquire a level of maturity will likely have negative repercussion on whole roll-out initiatives. It is along these lines that any future strategy involving the national rollout of telecentres should factor in current status of existing telecentres and should seek to help them grow into demonstration sites for national rollout initiatives to draw from. More particularly, the following support needs to be provided to existing telecentres before contemplating any form national roll-out strategies:

- technical backstopping support
- support in operation and management
- capacity development and
- exploring prospects of providing with additional revenue streams

The process leading to the establishment of current telecentres entailed rich learning experience in terms of all facets of telecentre establishment, operation and management. The staff recruited to run the centre and to carry out info-mobilization initiatives underwent a series of rigorous training programmes to arrive at a level of maturity and experience that they have currently acquired.



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The existing telecentres could therefore be valuable resource in the national roll-out scheme of telecentres – providing practical guidelines, helping develop business plan and helping with all facets of telecentre related activities including implementation, recruitment and info-mobilization.

Bringing the existing telecentres to a level of maturity will therefore have to be an integral part of overall national roll-out strategy. A thorough assessment of existing telecentres must be carried out before embarking upon national rollout of telecentres. It must be well understood that cogent argument in favour of national roll-out can not be made in a scenario where existing telecentre are left in poor state of operation.

5.1 Community participation in telecentre operation and management

Community participation in telecentre operation and management is important from the perspective of ensuring sustainability of telecentres and proper social-appropriation of ICTs as community members are best positioned to articulate their specific information, knowledge and communication needs and therefore to ensure that services offered by telecentres are aligned with such needs and requirements.

Table 4: Ensuring community participation in telecentre operation and management

Programme	Community Participation ensured through	Strategy adopted
ICTs for development	Telecentre Users Committes	Info-mobilization
SPPD-UNDP/UN-Habitat	Telecentre Users Committees	Info-mobilization
High Level Commission for IT	Telecentre Users Committee	Interaction with community members

From the perspective of national roll-out of telecentres, this underscores the need to devise implementation strategies that hold community participation as a key element. The best model for adopting such a strategy can be derived from social-mobilization initiatives that several of the UNDP and other donor supported development programmes have adopted. The info-mobilization activities as envisaged under ICTs for Development implementation should form a major component of national rollout strategies.

Current modality of operation adopted by ICTs for Development as well as National Information Technology Centre (NITC) ensure strong involvement of users committee in Telecentre operation and management. This is an ideal model of operation and should form the basis for national roll-out of telecentres.



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One of the areas that could be seriously explored is the development of strategies aimed at entering into **Public Private Partnership (PPP)** arrangements in various facets of telecentre operation and management. This could involve launching whole of the telecentre under PPP arrangements or some form of resource sharing mechanism in order to enhance overall value proposition of telecentres. For example, telecenter that is not equipped with a copier could explore partnering with private parties for providing the same for mutual benefit under some mutually beneficial arrangement. By using telecentre as a sales outlet, the actual owner of copier saves on rent and enjoys a regular stream of visitors whereas the telecenter creates value by providing 'one-stop' information and communication solution. Such an arrangement could involve sharing part of resources or basing whole telecentre on PPP model. An interesting example to this effect is seen on Bungmati VDC of Kathmandu where local cooperative and VDC have joined hands to launch a telecentre with the support from ICT for Development programme.

***The role of info-mobilization:
Soochana Saptaha in Milan Chowk,
Parbat***

With a view to raising the level of awareness of the local people about the importance of information and knowledge and popularize the services offered by the telecentre, the Telecentre Users Committee of Milan Chowk, of Salija VDC in Parbat organized a 'Soochana Saptaha (Information week)' from 12 -19 April, 2004 - a week long programme featuring street drama, local workshop and school level quiz contests.

The event which saw enthusiastic participation from the local community members was extremely successful in driving home the importance of information and knowledge in various socio-economic activities and contribute towards expanding users base of the telecenter.

6 CONCLUSION

The pilot initiatives that have been launched over the past two and half years have produced important knowledge and experience in the area of telecentre establishment, operation and sustainability. These could provide a strong basis for national rollout of telecentres in Nepal. Even though our overall readiness in relation to infrastructure, socio-economic situation and prevalent security situation, among others, remains challenging, ICTs are here to stay and be an integral part of evolution process of our society.

As such, we must have strategies in place that ensure productive and meaningful utilization of potentialities offered by ICTs so as to support overarching goals of development and poverty reduction by developing strategies for bridging gaps in information and service delivery. This is precisely where the issue of properly aligned implementation telecentres comes in – in the form of digital opportunities embodied in contents, services, business and development models that are designed to solve community problems and expand socio-economic choices of the community members.

This defines the context for any national rollout strategy for the telecentres. Our collective ability to leverage telecentres as agents of change will therefore depend not so much on the number of such centres that we will ultimately be able to establish, but rather on the way we are able to address major issues of infrastructure and institutional challenges and deficiencies and to focus on creating compelling value proposition of the telecentres for intended



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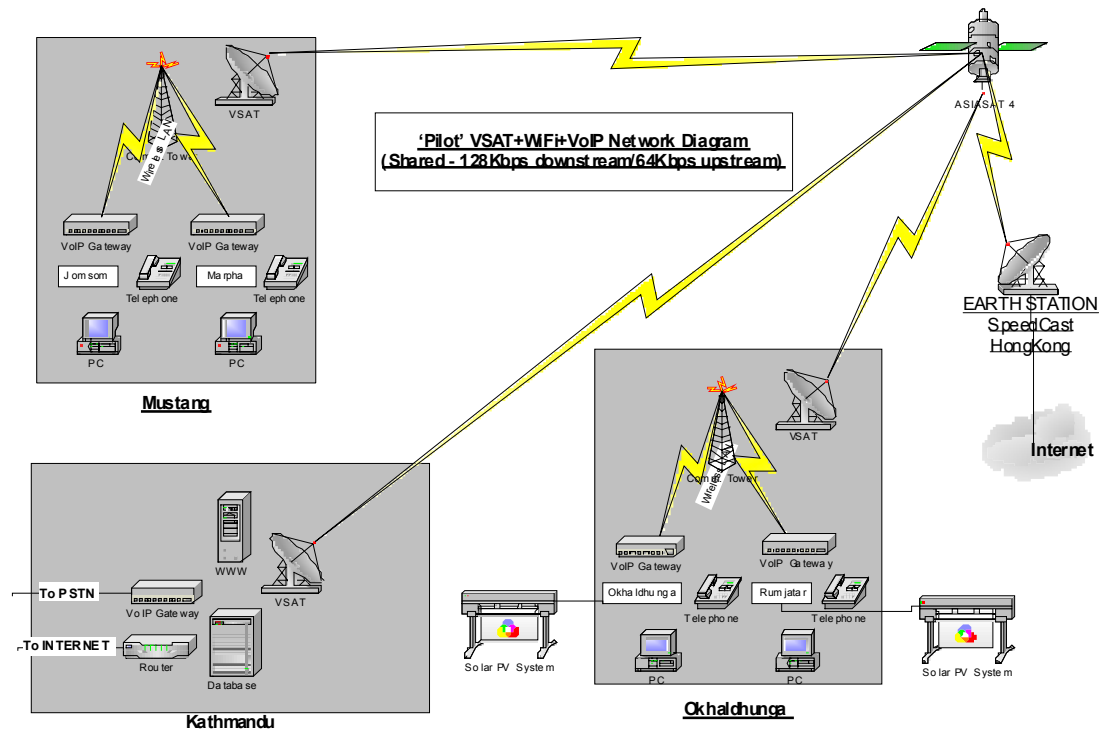
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beneficiaries. This can only be achieved in the presence of an enabling infrastructure, conducive policy and regulatory regime as well as political, bureaucratic and private sector commitment to leverage digital means to meet public ends within the context of poverty reduction and sustainable development.

VSAT based implementation

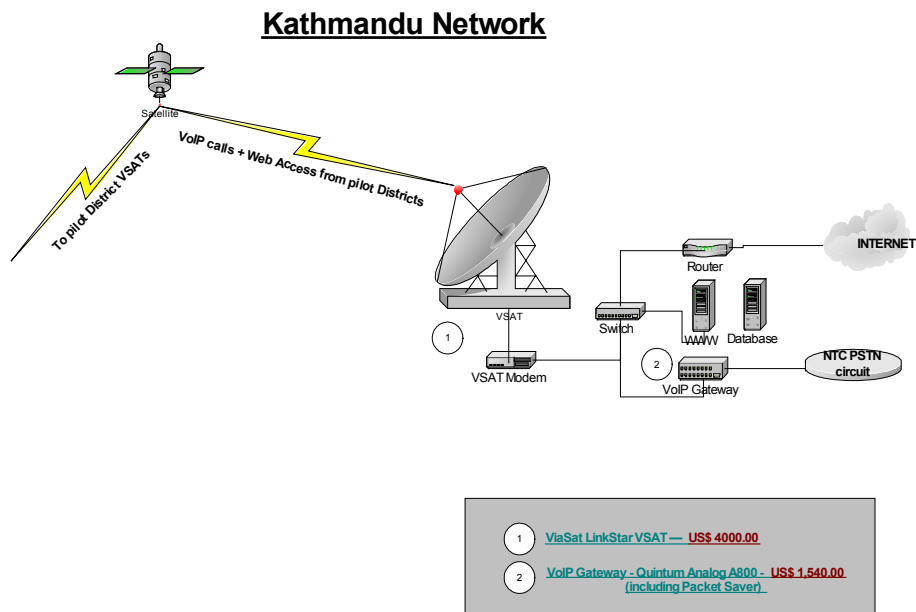
Schematic 1: Mustang and Okhaldhunga



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Schematic II: Kathmandu Network

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ANNEX 7: Rural ICTs in Nepal – Some Useful Websites

INTERNET AND TELECENTRES

<http://www.digidevnepal.org.np/index.htm>

UNDP Habitat – RUPP project “Assessing the Feasibility of ICT as a Development Instrument for Rural-Urban Linkages in Nepal”. Website includes reports on setting up telecentres, and further links.

<http://www.nepalwireless.net/>

Mahabir Pun’s initiative to provide internet access to five villages in Myagdi District.

<http://interconnection.org/coppades/projects.htm#ict>

Nepal ICT Project 2000

<http://www.ict4d.org.np/>

MOST and UNDP collaboration for rural telecentres

RADIO AND TELEVISION

<http://www.radionepal.org/>

Radio Nepal

<http://www.explorenepal.com/ntv/main.html>

Nepal Television

<http://www.radiosagarmatha.org/>

Radio Sagarmatha

<http://www.equalaccess.org/programs/nepal/index.htm>

Equal Access Digital Broadcast Initiative – radio broadcasting via satellite

<http://www.commoneronline.org/>

Communication Corner – radio programme producers

<http://ictpr.nic.in/tansen/welcome.html>

Tansen Community Media Centre

VIRTUAL NETWORKING FOR DEVELOPMENT IN NEPAL

<http://interconnection.org/ngonetwork/index.htm>

Coalition of many NGOs.

<http://www.devinfonepal.gov.np/>

Official government website for development information.



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www.nepalnet.org.np/

IDRC-supported development networking initiative.

<http://www.sapnepal.org.np/proginpresp%20Bellanet.php>

South Asia Partnership – Nepal's new collaboration with Bellanet on ICT for Development.

SOME CONTENT AND TRAINING INITIATIVES

<http://www.agripricenepal.com/>

Agricultural price information service

<http://www.apdip.net/projects/ictnd/2004/L25-np/proposal>

HealthNet telemedicine pilot

<http://catgen.com/eseWANepal/EN/index.html>

ESEWA – online marketplace for artisans, also supplying training

<http://www.lbef.org/project.htm>

Women Empowerment Through ICT project

<http://www.shantigriha.org/education.php>

Shanti Griha computer school

<http://www.coppades.interconnection.org/projectdetails.php?id=6>

COPPADES initiative to provide computers to schools

CENTRAL GOVERNMENT

<http://www.geocities.com/rnecairo/hmginfo.html>

Websites of government offices of Nepal

<http://www.moic.gov.np>

Ministry of Information and Communications

www.nta.gov.np

Nepal Telecom Authority

<http://www.hlcit.gov.np/>

High Level Commission on Information Technology.

<http://www.aepcnepal.org/>

Alternate Energy Promotion Centre

<http://www.redp.org.np/>

Rural Energy Development Programme



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LOCAL GOVERNMENT

<http://www.muannepal.org/#>

Municipal Association of Nepal (MuAN)

http://www.addcn.org.np/ddc/tel_list.html

Association of District Development Committees of Nepal (ADDCN)

<http://www.pddp.org.np/>

Participatory District Development Programme (PDDP)

www.lgp.org.np

Local Governance Programme (LGP)

www.rupp.org.np

Rural Urban Partnership Programme (RUPP)

INDUSTRY BODIES

www.ntc.net.np

Nepal Telecom

<http://www.utlnepal.com/index.jsp>

United Telecom Ltd

<http://www.npix.net.np/>

Nepal Internet Exchange



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ANNEX 8: Nepal Wireless project

Mahabir Pun left his native village of Nangi, near Pokhara, in 1989 to study at the University of Nebraska. Since returning and becoming headmaster of the Himanchal School there, he has managed to muster international support to provide Internet connections to Nangi and four neighbouring villages, as well as for local development efforts in education, health, and livelihoods. The material below is adapted from the story in Mahabir's own words on the website at www.nepalwireless.net.

So far we have networked five villages: Nangi, Paudwar, Ghara, Tikot, and Sikha of Myagdi district, Nepal. These villages are wirelessly connected to an ISP [WorldLink](#), which is 22 air miles (35 km) away from Relay Station 1. **Wlink** (the biggest Internet service provider in Nepal) is one of the sponsors of the broadband Internet connection to the villages. Nepal Wireless Networking project is operated from Himanchal Higher Secondary School in Nangi village.

In 1997 we wished to get Internet in the village for the first time after we got four used computers as presents from the students of a school in Australia. two 386 PCs, one 486 PC, and one laptop (486 PC). Our dream then was to have the students of Billanook College and Himanchal High School communicate with each other through e-mail. That dream could not come true instantly, as there was no phone line in the village to connect to the Internet.

For a while we got a radio phone for the village, but it did not work well. Even when it worked it was not clear enough to get an Internet connection. The next option was to get a satellite connection, but the cost was far too high. An email to the BBC in 2001 gave us some publicity and two volunteers came in early 2002 to the village from Belgium (Johan Verrept) and Finland (Jonni Lehtiranta), who had some ideas about wireless networking. Jonni Lehtiranta brought two Cisco PC Wireless Cards (Aeronet) that were donated by IBM Finland. Johan Verrept did some research on the Internet.

We did several experiments in 2002 with the cards that Jonni brought to test the connection between two villages, Nangi and Ramche, which are about one and a half kilometers (about a mile) apart across a river valley. We used ordinary TV dish antennas and some home-built antennas for the testing.

After an article in the San Jose Mercury News, people donated seven D-Link 900 AP access points, which were the cheapest access points available in the market. Johan Verrept from Belgium decided to come for a second time to my village to help me to do more testing. He arrived in Nangi in March 2003. We did testing for three weeks trying to connect my village to Pokhara (the nearest city with an ISP) using an ordinary TV satellite antenna (8 ft in diameter).

For this Johan set up a Linux server in Pokhara. We installed a TV dish antenna (8 ft wide) on the rooftop of my uncle's house in Pokhara and connected it to the radio by modifying its built-in antenna. We pointed the dish antenna towards the 3,320m (11,000 ft) high mountain range (The Pun Hill Range) that was stretching between Pokhara and my village.



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We used a tall tree on the top of the mountain as a relay station. On the tree, we tied two dish antennas (one 8 foot wide and the another 3 ft wide), a 50W photovoltaic panel with 40 amp-hour rated 12V storage battery along with two D-Link access points. We put the access points, the power supplies, hubs, voltage convertors in a wooden box and tied it near the antenna on the trunk of the tree. We also put a TV dish antenna (8 ft in diameter) in our village pointing towards the relay station.

We found that we definitely could connect Pokhara to my village using the 802.11b access points because we could connect to Pokhara from the relay station hill.

However, we could not connect to Pokhara directly from the village that time even though we tried everything we could. We tried to get technical assistance from the support team of D-Link, however, they told that they would not provide any support if we had modified the built-in antenna of their access points.

After Johan left I played with the access points for a few more weeks and figured out that I could connect to Pokhara if I set the transfer rate at 2 Mbps, put the access points further apart and put a screen made of aluminum foil in between them. It worked well but there was shortage of power to run the radios.

It took 7 years for the wish to be fulfilled. Finally, Mark Michalski got a grant from Donald Strauss Foundation. Mark Michalski, Robin Shields, Sage Radachowsky, and James Pearson came in August. Before they came, they did some testing of the equipment in Los Angeles. Robin did a lot of research on the server program (Jana Server 2) that we are using now and Sage found a suitable outdoor access point, made by smartBridges, Mark bought the following equipment with the money he got from the grant:

- 12 smartBridges Air Point Pro Access Points
- 14 lightening arrestors for the access points
- 14 Pacific Wireless 24 dB Directional Antennas
- 2 120W Solar Panels and Voltage Regulators
- 2 400W Air-403 Wind Generators
- 3 75 Amp-Hour Trojan Deep Cycle Gel Batteries

In this way the three week process of installing the wireless equipment started on August 22. Since the team had arrived in Nepal in the middle of the monsoon, it rained almost everyday we were working. Jo Ann Ong (from Texas) also joined the team when we were half way through. Pointing the antennas in the right direction was the main problem. We could not see Pokhara and Relay Station 2 at all from the Relay Station 1 hill. We had to guess based on our instinct to direct the antenna towards the server in Pokhara and Relay Station 2.

At present we are using the network mostly for communication purposes since the network is the only means of communication available. The people from the five villages can send and receive their messages through e-mails using our POP server, which is run by Jonni Lehittranta in Finland. We have provided NepalWireless.net accounts to all those who want



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their own e-mail account²². Students from two high schools are using the network to write e-mails to each other and to their pen-pals abroad. In the past, the students used to send letters to their pen-pals through "snail mail" which used to take months. Now they can communicate within a matter of minutes no matter where they are located. Also, the teachers and students are getting access to some educational materials that we have put in the intranet.

Paudwar and Nangi villages are using the network to run their income producing projects smoothly. They have been running Yak farming and Camping Grounds on joint venture basis way up from the villages (at 12,000 ft) for several years. Now the management committee of the projects are using the network to communicate with each other through NetMeeting or email in order to take appropriate decision for the projects. Moreover, we have given laptops to the camping ground and Yak farming staff. The management committee and the staff communicate regularly with each other to run the projects smoothly.

Now the communication with Robin Shields, who is helping to run an e-commerce site called [Himalayan Handicraft](#) for the villages, has been much easier. We are hoping to expand the business in future.

A new intranet server has been created by Phillip Mucci. Once power supply issues are resolved, it will allow Nangi and surrounding villages to build and share locally relevant content. Possible uses include remote teaching, local news distribution, cheap communication, and sharing teaching resources.

Educational Plans: We are in the process of developing and collecting educational materials for the teachers and students. We will develop teaching materials for different grades on different subjects. For the students, we will develop and collect reference materials based on their textbooks. We will put those materials in the intranet so that the teacher and the students will have access to those materials any time they need them. The intranet will also have a section where the students can publish and share their works such as poems, songs, drawings, and essays with other students.

One of our main goals is to use the network for live distance teaching by one teacher from one high school to the students of several other high schools. We are looking both for technical and financial assistance for doing this. If we succeed in this, it will help to fill the shortage of qualified teachers in the rural areas.

One of Nangi's long-term goals continues to be the development of computing technology. A new teaching program has been created to introduce both the teachers and the students to the world of modern computer programming, specifically by using the language C++. The current focus is to provide brief training for several teachers, while simultaneously developing instruction handouts and homework assignments for students.

²² In September 2004, 107 people, mainly students and teachers, had their own email account (of the 8,000 population of the five villages).



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Tele-medicine Plans: We are also in the process of setting up tele-medicine program between Nangi village and Pokhara city. Actually the technical set up has been completed. The idea is to have the doctors in Pokhara communicate with the patient in the village clinic directly through video-conferencing in order to treat the patient. The village health worker on village side will assist the communication between the doctor and the patient and will provide the medicine prescribed by the doctor. After the tele-medicine program between Pokhara and Nangi starts smoothly running, we will set up the same program with Paudwar village too.

We plan to teach the village health worker computer skills for basic emailing and communication; to set up an emailing account for the Nangi clinic; teach the Nepali physician in Pokhara computer skills for basic emailing and communication; and set up an email account for communication with Nangi Clinic.

E-commerce Plans: Our future goal is to teach students and villagers how to start and manage e-commerce site on local level. The students will be able to help the villagers advertise the products locally and sell them. The students and the villagers thus will be able to learn a skill to make their living. On the long term, we hope to get help from some of the students to run and manage our non-profit e-commerce site <http://www.himalayanhandicraft.org/> in order to sell the products from different villages worldwide.

Network Expansion Plan: We don't want to keep the network limited within these five villages. We would like to help other villages get the technology and benefit from it. With the existing system that we have set up now, we can extend the network to at least nine more villages provided that we get wireless access points and used computers (at least Pentium I). These villages are Ghorepani, Khibang, Bhurung, Doba, Bega, Rakhu, Jhin, Patalekheta, and Ramche. If we build one more relay station, the network can be extended to several more villages in the Parbat and Baglung districts of Nepal. In this way we can extend the network to larger areas of Nepal, making the name NepalWireless.net a reality.

Improved power supply: Email is vitally important to Nangi. In the case of every day needs and in emergencies, it is the only method of communication between Nangi and the rest of the world. Although the network has been a huge step forward for Nangi, it has had its share of problems. The biggest is the inconsistent supply of electricity in Pokhara, Nangi and other villages. To help

solve this problem, Nangi is looking for an uninterrupted, continuous power supply for its internet server in Pokhara and computers of the villages. It would include batteries, an inverter and a charger.

Nangi has been constantly plagued by power shortages. The government supply of power has been very inconsistent and only comes on for a few random hours per day. Sometimes it does not come for weeks. Unfortunately, this situation will not improve anytime soon. Because they are afraid of attacks by Maoists, the government workers rarely come to rural Nepal to maintain the electricity grid. This conflict is growing worse, not better.



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Right now, Nangi has access to one small generator during the day that can supply power for one or two desktop computers - on a good day. The shortage of power is a serious problem affecting communication, health care, computer education and general development programs in Nangi. In order to address the current shortage, Nangi is looking for ways to obtain its own 10-15kW hydro generator that would be installed in a nearby river. The estimated cost is US\$1.

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