

**E-SRI LANKA'S TELECOM-ENTER DEVELOPMENT PROGRAM:  
STRATEGIC CHOICES AND CHALLENGES OF A HIGH IMPACT –  
HIGH RISK INVESTMENT**

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The views expressed in this document are those of the authors and do not necessarily represent the official position of the FAO or the ICTA.

This paper builds on the recent design of the VGK program which has benefited from a number of contributors: Motoo Kusakabe, Harsha de Silva, Rohan Samarajiva, Harsha Liyanage, Galin Kora and Nagy Hanna. It is an operational document that builds on earlier conceptions of an evolving program.

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**OVERVIEW AND BENCHMARKS**

**Introduction**

Sri Lanka is at a crossroads. Its citizens proudly remember early achievements that made their country a model developing nation. After 20 years of civil war, they look back with a sense of frustration for opportunities lost.<sup>1</sup> They look to the future with guarded optimism and anticipation for lasting peace and renewed development momentum.

The e-Sri Lanka initiative builds on one of the brightest spots in the country's recent economic development. Privatization and the opening to competition of the telecommunications market<sup>2</sup> encouraged investment and gave impetus to the ICT sector. e-Sri Lanka builds on these reforms to overcome remaining lags in ICT development (Table 1).

**Table 1. ICT Indicators: South Asia and Selected Countries**

Country	Population 000 000	Per capita GDP (2001)	2002				2003 e-Gov Web Measure Ranking
			Internet Users	PCs	Fixed Telephone Lines	Cellular Subsc.	
			---- per 100 inhabitants ----				
<b>South Asia</b>							
Bangladesh	133.1	346	3.8	1.2	0.5	0.8	135
Bhutan	0.7	734	1.4	1.4	2.8	-	164
India	1041.8	474	1.6	0.7	4.0	1.2	32
Pakistan	145.7	387	1.0	0.4	2.5	0.8	69
Maldives	0.3	2,258	5.3	7.1	10.2	14.9	81
Nepal	23.2	241	0.3	0.4	1.4	0.1	65
<b>Sri Lanka</b>	<b>19.0</b>	<b>836</b>	<b>1.1</b>	<b>1.3</b>	<b>4.7</b>	<b>4.9</b>	<b>74</b>
<b>Other Asia – Pacific</b>							
Australia	19.7	18,481	42.7	56.5	54.0	64.0	3
China	1,284.5	907	4.6	2.8	16.7	16.1	61
Indonesia	212.1	695	3.8	1.2	3.6	5.5	40
Korea (Rep.)	47.6	9,923	55.2	55.6	48.9	68.0	18
Malaysia	24.5	3,684	32.4	14.7	19.0	37.7	35
Singapore	4.2	20,752	54.0	50.8	46.3	79.6	8
Thailand	61.9	1,874	7.8	4.0	10.5	26.0	50
<b>Other</b>							
Canada	31.4	22,966	48.4	48.7	63.5	75.5	6
Chile	15	4314	23.8	11.9	23.0	42.8	2
Estonia	1.4	3,794	41.3	21.0	35.1	65.0	13
Ireland	3.9	26,829	27.1	42.1	50.2	75.5	17
Germany	82.5	22,265	42.4	43.1	65.1	72.8	11
USA	288.4	35,843	53.8	65.9	65.9	48.8	1
UK	59.1	23,694	40.6	40.6	59.5	84.5	5
Sweden	8.9	24,626	57.3	62.1	73.6	88.9	10

Telecommunications Indicators from ITU (<http://www.itu.int/ITU-D/ict/>)

Web Measure ranking for 2003 from [UN 2003], based on quantity and quality of e-Government content online.

The Tele-center or VGK Program - for *Vishva Gnana Kendra* or "Global Knowledge Centers" - is a most important component of e-Sri Lanka. By expanding connectivity into rural areas, where 80% of the people and nearly 90% of its poor live (Table 2), the Program will enable the provision of critical services to rural communities. It is the most visible component of e-Sri Lanka, the one offering the highest potential and widespread benefits, especially amongst the impoverished and underserved rural population. It is the component that ordinary citizens will most readily connect to.

**Table 2. Population and Incidence of Poverty by Urban-Rural Sector**

	<b>Percentage of Poor Households 2002</b>	<b>Rural population as % of total - 2001</b>	<b>% Sector Share of the Poor Population in 1995/96</b>
	<b>(1)</b>	<b>(2)</b>	<b>(3)</b>
<b>Rural</b>	24.7	80.0	87
<b>Estate</b>	30.0	5.3	4
<b>Urban</b>	7.9	14.6	9
<b>Total</b>	22.7	100	100.0

Statistics exclude the North and the East.  
 (1) Household Income and Expenditure Survey 2002 [Gov. of Sri Lanka 2004].  
 (2) Census of Population and Housing 2001, Government of Sri Lanka [2001].  
 (3) World Bank [2002], page 66. Based on Headcount.

The VGK Program is also a risky undertaking. Success is conditional on the performance of other critical parts of the ICT program, on the extent to which large numbers of people adopt a new technology and learn of new skills, on major changes in governmental attitudes and procedures and the way that public services are delivered, and on extensive multi-sector and inter-institutional coordination. Because of its visibility and importance, tele-center establishment is also susceptible to political influence which can in turn undermine effectiveness. Caution is warranted during both, planning and implementation.

This paper gives a summary description of e-Sri Lanka's Tele-center Development Program. Potential benefits and challenges are identified. Recommendations are offered to help government make strategic choices to increase impact and sustainability, and to mitigate risks and overcome challenges.

**The Vishva Gnana Kendra Program**

**Overview**

Tele-centers are "shared premises where the public can access information and communication technologies" [Colle and Roman 1999]. Sri Lanka's tele-centers will offer telephone services as well as computer use, Internet connectivity and fax and photocopying services.

Telecentres will be progressively established in rural areas, starting in the deep South and in the North East, where connectivity will be provided through the Regional Telecommunication Networks (RTN's) set up with project support.

The program's target are residents of small rural communities (e.g. farmers, rural youth) residing in small towns with between 2,000 and 5,000 people. Parallel distance e-learning and basic computer literacy training services will also be provided to a broader population that also includes urban and peri-urban disadvantaged groups.

The following outputs are envisaged:

i. a network of 200 Tele-centers providing low cost access to ICTs to small rural communities in the country, 100 in the deep South and another 100 in the North and Eastern Provinces; and

ii. a network of 8 distance e-learning centers, each furnished with a video interactive room, a computer laboratory and a small playback room<sup>3</sup>.

Two other complementary outputs of e-Sri Lanka will further support the VGK program:

iii. an extensive program to train Sri Lankans in basic computer skills (e.g. along the lines of the International Computer Driver License curricula), and to enable rural schools to improve the cost of rural education through the use of ICTs in support of their academic programs; and

iv. complementary financing of grassroots initiatives, local content and community investments that make effective use of ICTs.

### Implementation Framework

A summary description of institutional responsibilities is given in Table 3.

**Table 3. Institutional Implementation Framework**

<b>Institutions</b>	<b>Roles and Responsibilities</b>
<b>ICT Agency</b>	<ul style="list-style-type: none"> <li>• Overall program implementation planning</li> <li>• Overall program management</li> <li>• Disbursement of ICT Capital and Connectivity Subsidies</li> <li>• Project oversight</li> <li>• Policy and guidelines compliance</li> <li>• Quality Assurance</li> <li>• Training VGK Support Institution facilitators</li> </ul>
<b>VGK Support Institutions</b>	<ul style="list-style-type: none"> <li>• Training and capacity building for VGK Operators</li> <li>• Support in setting up VGKs</li> <li>• Provision of ongoing managerial, technical and logistical support to VGK operators</li> <li>• Where possible, source content for the VGKs</li> <li>• Act on behalf of ICTA to ensure the 5 year service obligations are fulfilled in every targeted community</li> </ul>
<b>VGK Operators</b>	<ul style="list-style-type: none"> <li>• Setup and operation of VGKs</li> <li>• Provide the specified ICT services through the VGKs</li> </ul>
<b>Managing Agent for Voucher Scheme</b>	<ul style="list-style-type: none"> <li>• Implement the Voucher scheme</li> <li>• Manage and Administer voucher scheme</li> </ul>
<b>Monitoring and Evaluation Unit</b>	<ul style="list-style-type: none"> <li>• Monitors &amp; Evaluates VGK performance through monthly reports and also through periodic evaluations of outcomes throughout the duration of the program</li> <li>• Evaluates impact of initiative later in the project</li> <li>• Report to the ICTA on a quarterly basis on the performance of the VGKs and VGK Support Institutions</li> </ul>
<b>RTN Operators</b>	<ul style="list-style-type: none"> <li>• Construct Regional Telecommunication networks on the designated areas</li> <li>• Provide Mandatory Service to the VGKs for a pre-agreed number of years.</li> </ul>

ICTA with its small team will retain overall coordination responsibility for planning, program management, ensuring compliance with agreed policies and guidelines, and overall quality assurance. In addition, five other types of institutions will be involved: (a) Vishva Gnana Kendra (VGK) operators; (b) VGK Support Institutions (VGK SIs); (c) a Managing Agent for the voucher scheme; (d) Suppliers – equipment and connectivity and (e) an independent Monitoring and Evaluation Unit. The largest and most diverse will be a group of two hundred telecenter (VGK) operators recruited under competitive selection procedures.

### *Selection of Locations*

The VGK program's primary focus will be on rural communities with a population of no more than 5,000. To provide minimum conditions conducive to sustainability, the locations of the sites have the following characteristics: (a) a minimum population of 2,000; (b) presence of a secondary school with at least 300 students; (c) a reliable supply of electricity through the grid; and (d) proximity to a fixed market center with at least 15 wholesale vendors. The selection of VGK sites have been based on these crucial criteria agreed with the stakeholders.

### *State Assistance*

To help establish and sustain the telecenters over an initial period, the program will fund the ICT equipment and software requirements of the telecenter and will pay for the cost of connectivity albeit through a declining subsidy over the first four years of operation. The prospects of VGK sustainability will be further enhanced by parallel funding available to users under the voucher program, and to grass roots initiatives under the e-Society fund. ICTA will ensure the connectivity to the VGKs by entering into a mandatory service agreement with the RTN provider (a program which will be run in parallel).

### *VGK Operators and VGK Support Institutions (VGK SIs)*

VGKs can be operated by a local entrepreneur, an NGO, or the manager of a local public service agency (public library, local school, community center).

While people in rural Sri Lanka have experience in conducting and managing different types of businesses, in order to increase their business capabilities, and to improve the chances for a successful implementation and long term sustainability of the VGKs, they are likely to need managerial, logistical and technical support.

To provide the necessary support services, eight VGK Support Institutions (VGK SIs) have been pre-selected through a competitive selection process. This selection has been based on criteria comprising; management and organizational capacity, business skills, technical experience, logistical capability and relevant community development experience. In addition these VGK SIs will also help the selected operator establish the VGK and also fulfill their on-going training requirements.

ICTA will employ a "cascade" training model; it has obtained technical assistance to design training toolkits and curriculum and also to train the VGK SIs facilitators. As part of their support to the VGKs, the Support Institutions will have to provide a number of facilitators, whom once trained will be the trainers for the VGK operators, staff and community champions. ICTA and VGK SIs will engage communities to build awareness on VGK operations, services and benefits of ICT, in the areas where VGK will be established.

VGK operators will be able to choose the VGK Support Institution they wish to be associated with from the eight pre-selected organizations or with another organization



provided they fulfill the same SI selection criteria. Association between the VGK operators and SIs can be in two ways:

- 1) Partnership with a qualified VGK SIs, in which case a joint proposal can be submitted during the bidding process.
- 2) A Service fee based agreement, entered into with a qualified SIs, subsequent to the operator being selected.

The sustainability of the VGKs will very much depend on providing relevant and useful content and applications to the communities it serves. Once the VGKs are in operation the SIs will play a major role in facilitating content development by operators, grass roots organizations and individuals.

### *Demand Encouragement*

The VGK Program will also endeavor to expand the use and clientele of VGKs rapidly and, simultaneously, will enhance secondary education in rural communities by providing for teacher training and enabling the use of the VGK facilities by local school authorities. In conjunction with the below mentioned voucher program, this will help secure the productive use of the VGK facilities, especially during the morning hours, which tend to be the low-use time.

As an additional mechanism of creating sufficient demand, a voucher system will also be established to provide clients of the VGKs with a cost supplement to encourage utilization. The management of the voucher scheme will be outsourced to a Managing Agent contracted through the ICTA. The vouchers will be: (a) non-transferable; (b) have a variable value based on the market price per unit of service but with an upper limit; and (c) be retroactively re-imbursed, only after the service has been completed.

### *Monitoring & Evaluation*

An independent Monitoring and Evaluation Unit will monitor implementation progress and undertake periodic evaluations of the VGK operation, the activities of the VGK Support Institutions, and the Managing Agent of the voucher scheme. The Monitoring and Evaluation Unit will report quarterly to ICTA. This Monitoring and Evaluation Unit will outsource certification of compliance of the VGK five-year service contracts.

## **Success Benchmarks: Impact and Sustainability**

### **Development Impact**

Poverty in Sri Lanka is predominantly rural. Over half of the country's farmers and farm workers are poor (Table 4). Agriculture employs about 40% of the labor force yet only accounts for about 18% of national production [Ratnayake 2002, p. 16].

The bulk of Sri Lanka's poor are: people living in remote rural areas with limited access to infrastructure; landless workers that depend for survival on low wage occasional employment; farmers cultivating low-value crops in very small parcels of land; plantation workers; workers in fisheries and livestock sectors; squatter settlers cultivating marginal rainfed or small parcels of irrigated lands; and dwellers of peri-urban shantytowns.

**Table 4. Incidence of Poverty by Sector of Employment**

Sector	Incidence of poverty (%)	Share of total number of poor
<b>Agriculture</b>	51	42
<b>Mining and Quarrying</b>	59	2
<b>Manufacturing</b>	36	11
<b>Construction</b>	44	7
<b>Wholesale and Retail Trade</b>	30	9
<b>Transportation</b>	26	4
<b>Finance</b>	10	0.4
<b>Communications</b>	23	10
<b>Unclassified</b>	67	10
<b>Unemployed/Non-Labor Force Participants</b>	28	5

**Source:** Household Income and Expenditure Survey 1995/96, Department of Census and Statistics cited in [PRSP 2002, page 135]

To have significant impact the tele-center program must address rural poverty and its causes. Some of the principal determinants of rural poverty in Sri Lanka are:

- limited assets,
- limited access to low-cost high quality services,
- weak bargaining position of farmers,
- few off-farm income earning opportunities, and
- low productivity context.

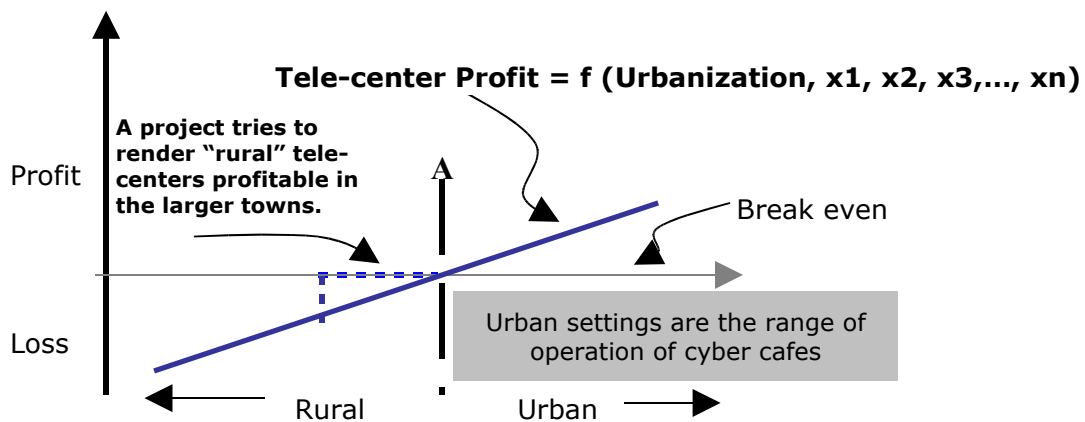
## **Sustainability**

The benefits derived from a rural tele-center program should also be sustainable.<sup>4</sup> A systemic concept of sustainability that goes beyond the individual tele-center is essential. Commercial tele-centers, i.e. Cybercafes, for example, are not all sustainable. Some fail while others thrive. Yet the system as a whole is resilient as long as there is a demand for the service. In a similar vein, all of the tele-centers set up through State Action **need not survive**. What is important is for the service to continue - provided by either tele-centers initially sponsored by the State, or by other centers that subsequently open to help meet the increase in demand stimulated by the program.

An individual center is sustainable if it is able to generate sufficient revenues to cover operating expenses (i.e. operational sustainability), and hopefully also earn a return on investment so that it can eventually replace its capital equipment (full financial sustainability). In a competitive urban center, competition forces tele-center prices and profits down to the bare minimum; to the benefit of consumers.<sup>5</sup>

Figure 1 shows a tele-center profit's as a function of urbanization. Urbanization is a powerful proxy for underlying variables correlated with a cosmopolitan environment, such as high population density, low cost of connectivity on account of a well developed telecommunications infrastructure network, ease of making repairs and maintaining

equipment, and relatively higher educational attainment of the customer base. Population density is critical, because tele-centers are highly susceptible to distance – few persons will venture to use a tele-center located far from home or their workplace. The higher the density the easier it is to attract a steady clientele to fill the workstations.



**Figure 1**

Some determinants of VGK profits may be influenced by a project but others cannot (Table 5). A project cannot change a given town’s population density. To acknowledge this limitation the focus of e-Sri Lanka’s VGKs is on towns with at least 2,000 people.

A project also cannot improve community income overnight or otherwise affect a community’s ability to pay for tele-center services in the short term.

A well designed project can however help lower rural connectivity costs, e.g. by expanding rural infrastructure as provided for by the e-Sri Lanka’s Network component through the implementation of the RTNs (Table 5). It can also help avoid technological lock-in into a costly proprietary software environment. On the revenue side, a project can enhance the quality and quantity of services provided, and thus motivate rural residents to use and pay for them.

**Table 5. Key Determinants of Tele-center Profits, Effect of Urbanization and Project Target Variables**

	Urban	Rural	Factors amenable to change
<i>Cost</i>			
Connectivity	Low	High	Yes – RTN component
Equipment O&M	Low	High	
Software	Neutral		Yes – through national policy
<i>Revenue</i>			
Population density	High	Low	
Ability to pay	High	Low	Yes – but in the long term
Willingness to pay	High	Low	Yes – through valued services

Table 6 identifies three kinds of services and delivery mechanisms or “action lines”:

- i. communications provided through access to the VGK equipment (i.e. telephone, e-mail and chat lines);
- ii. locally provided social and community development services enabled and provided in combination with the tele-center communication and information services; and
- iii. government services online: e-Government.

**Table 6. Effect of Service and Delivery Mechanism on Willingness and (over time) Ability to Pay**

<b>Service and Delivery Mechanism</b>	<b>Effect on willingness/ability to pay</b>
Communications	Enhance
Social and community development services provided locally	May enhance impact but, if costs are assumed by the center, it will burden sustainability.
Government services online	Enhance

## THE CHOICES

The way that the three action lines identified in Table 6 can help overcome the constraints faced by Sri Lanka's rural population is outlined in Table 7. The first two – communications and locally provided community services - involve the initiative of individuals, enterprises and grass roots organizations. They are potentially more important than the third, but they are also more difficult to anticipate. Properly supported, private initiative is a powerful engine of innovation and rural development.

Greater attention is given here to the third action line: the provision of Government services online. This is because, in order to be effective, e-Government requires a focused and purposeful choice by the State. e-Government is also a more challenging and riskier undertaking than the other two action lines.<sup>6</sup>

**Table 7. Causes of Rural Poverty and Potential Impact of Tele-center-Enabled Access to ICTs**

Cause of Poverty	Potential Impact of ICTs on Sri Lanka's Rural Dev. Constraints	Provision of High Impact ICT Services Affecting Willingness and Ability to Pay for Tele-center Services		
		Communications	Local provision of community dev. Services	e-Government (examples)
Few assets	Enhanced information & opportunities to build up assets	Opens up for individuals, access and opportunities to exchange idiosyncratic information with family, friends, business associates and an expanded network of contacts	Organizational and technical support tailored to seize local opportunities and satisfy the particular needs of individual communities.	Land registry
Limited access to high quality services	Expanded access & low-cost provision of high quality services			Microfinance info.
				Distance education
Low productivity context	Increased access to information on better products and techniques			Support to Rural Health Workers
Low bargaining power	Expanded competition, Wider markets, Lower transaction costs			e-Money Order
Limited opportunities to earn off-farm income	Increased info. on jobs and income opportunities elsewhere; Wider markets for processed products			Online technical assistance to farmers
		Market portals with advice & mkt. intelligence info. online		
Limited power to influence policy and programs	New opportunities to organize and to influence local policy – virtual activism.	Job Placement Portal		
		Online technical assistance to SMEs		
		State purchase info. Portals		
		Gov. portals with project & grant info.		
		Local government online		

## Communications

Communications provided through VGKs (telephone, e-mail, Internet telephony) will enable rural people to overcome some of the major constraints they face, by putting within the reach of every farmer and rural resident the ability to exchange specific idiosyncratic information about markets, projects, and community activities and local government. It will enhance their lives in many ways, as rural people are now enabled to contact and keep in touch with personal networks, learn about markets, refine production techniques, and eliminate time traveling to get information and services.

Reminiscent of the early development of snail mail and the telephone, social interaction through e-mail and chatting is often undervalued as “superficial”; yet these forms of “point to point” communications form the basis for socialization, the development of trust and economic interaction and exchange ([Proenza 2002], [Odlyzko 2000]).

One of the most valuable kinds of information to a farmer is market intelligence. A farmer or representative of a producer’s group living in Nuwara Eliya, might be able to learn much from the radio or from formal web sites prepared by the Department of Agriculture. But he will also be very interested in knowing what the price of his high value specialty product can fetch in European markets, who the buyers in those markets are, what kind of quality is demanded, and how he himself, on his own or jointly with other Sri Lankan producers, can sell in that market. If he can further find out from another producer (say a virtual friend living in Sri Lanka or elsewhere) with whom he has been networking through e-mail, what kind of a person or company (trustworthy, good making payments, reliable) will be a particular European buyer interested in purchasing a large shipment of high value vegetable products, he will gain invaluable information that is impossible to reproduce through more formal means (such as, for example, a Government information survey-based service).

Even in developed markets where telephone service is ubiquitous, e-mail provides valuable conveniences of a different kind. It is, for example, by far the most important purpose for using the Internet in the US. ([NTIA 2002], p. 31).

**Table 8. Activities of US Individuals Online (2001) as a Percentage of Internet Uses, Persons Age 3+**

	Percentage
On-line Education Courses	3.5
Make Phone calls	5.2
* Trade Stocks, Bonds, Mutual Funds	8.8
* Job Search	16.4
* Online Banking	17.9
Chat Rooms or Listservs	17.3
View TV/Movies, Listen to Radio	18.8
** Complete School Assignments	24.8
* Government Services Search	30.9
* Health Services or Practices Info. Search	34.9
Product/Service Purchase	42.1
Playing games	42.1
News, Weather Sports	61.8
Product/Service Information Search	67.3
e-mail	84.0

\* These online activities surveyed individuals aged 15 years and over only.

\*\* This activity was asked of all respondents. Among users enrolled in school, the percentage of Internet users completing school assignments is 77.5.

**Source:** [NTIA 2002], page 31.

The VGKs will expand access to both the telephone and Internet-enabled communications. Telephony, a service that is well known and highly valued in the target communities (Table 9), will be more significant, especially at first. But other modes of communications though the Internet (e-mail and chat) can also become very important.

**Table 9. Present Use of ICT Tools in Deep South and in North and Eastern Provinces**

	Deep South	North & East
<b>Main tools used for sending and receiving information</b>		
Telephone	49.8%	51.2%
Newspaper	47.2%	22.4%
Fax	1.3%	8.6%
Internet		6.2%
<b>Telephone use</b>		
Used the telephone at least once	85.0%	81.7%
Used the telephone in the last three months	53.2%	58.0%
<b>Destination or origin of last 3 telephone calls</b>		
Local or another community within Sri Lanka	99.0%	78.1%
International		21.9%
<b>Purpose of last 3 outgoing calls</b>		
Social calls to family and friends	78.6%	71.8%
Business conversations	8.8%	11.3%
Conversations related to illness, health or death	5.1%	8.8%
<b>Reasons for not using phone</b> given by respondents who had used it at least once, but not in last 3 months		
Nobody to call	46.6%	91.1%
No need to make a call		5.9%
Lack of phones	11.4%	1.3%
Phones too far	10.7%	
<b>Percent of respondents who use the Internet</b>	1.3%	9.6%
<b>Reasons given for not using the Internet</b>		
No need for using the Internet	57.5%	36.9%
Don't know how to use the Internet	29.3%	24.6%
Internet is not available in the community	12.0%	22.5%
Difficulty with the language of Internet	1.0%	8.5%
Price of connection	0.2%	7.6%
<b>Services respondents would like to receive from VGK</b>		
Telephone	27.0%	23.0%
Training	20.0%	14.0%
Photocopy	17.0%	15.0%
Internet	9.0%	15.0%
Fax service	9.0%	14.0%
Answering	7.0%	11.0%
Other	5.0%	
Typing	4.0%	7.0%
<b>Information needed according to respondents</b>		
Agriculture	21.0%	
Politics	16.0%	
Education	9.0%	
Entertainment	8.0%	
Business	7.0%	
Health	1.0%	
Other	36.0%	

**Source:** ICTA Survey (March 2004) in Program Target Areas: Deep South and North and East Provinces.

To increase familiarity with the new technologies rapidly, computer literacy training has been included as an important element of the e-Sri Lanka initiative. Children are known to adopt information technology more rapidly than adults, and given the relative maturity of Sri Lanka's population (Table 10) - training will be essential.

**Table 10. Social Development Indicators – Selected Asia and Pacific Countries**

Country	Population age < 15 (% 2001)	Literacy Rates (2001) *	Gross Enrollment Ratio (2000-01) **	Under 5 Mortality Rates (per 1000) ***	Probability of not surviving to age 40 ****	HDI Ranking	Gender Related Dev. Rank
<b>South Asia</b>							
Bangladesh	38.8	40.6	54	77	17.3	139	112
Bhutan	42.3	-	33	95	17.3	136	-
India	33.7	58.0	56	93	15.3	127	103
Pakistan	41.8	44.0	36	109	17.8	144	120
Maldives	43.4	97.0	79	77	10.2	86	-
Nepal	40.5	42.9	64	91	19.3	143	119
<b>Sri Lanka</b>	<b>25.5</b>	<b>91.9</b>	<b>63</b>	<b>19</b>	<b>5.1</b>	<b>99</b>	<b>80</b>
<b>Other Asia – Pacific</b>							
Australia	20.3	-	114	6	-	4	4
China	24.3	85.8	64	39	7.1	104	83
Indonesia	30.4	87.3	64	45	10.8	112	91
Korea (Rep.)	20.6	97.9	91	5	3.4	30	30
Malaysia	33.4	87.9	72	8	4.2	58	53
Thailand	25.9	95.7	72	28	10.2	74	61
Singapore	21.5	92.5	75	4	1.9	28	28

Source: [UNDP 2003]

\*% Age 15 and above (2001); \*\*Combined primary, secondary and tertiary (2000-2001).

\*\*\* Per 1000 live births. \*\*\*\* Percent of cohort 2000-2005. HDI: Human Development Index

"-" not ranked or no estimate given.

## Community Services

Local initiative, of provincial authorities or of non-governmental and grass roots organizations, can significantly enhance VGK impact.

Consider financial services. The costs of obtaining and maintaining up to date reliable information for the supervision of loans in remote rural areas with thin and scattered populations are very high, and thwart the emergence of low-cost rural financial service institutions [Wenner and Proenza 2000]. This is why the formal banking sector has limited reach of in rural communities and supplies less than 19 percent of the credit requirements of Sri Lankan smallholders [Bandara 1997], often forcing the rural poor to rely on high interest moneylenders [Olsen 2001]. Non-governmental organizations, using local knowledge in a way that resembles those of the moneylender, increase local competition in the supply of financial services and often provide an effective and valuable alternative service at a lower cost.

Computerization has made it possible for microfinance institutions to manage a large number of loans in a cost-effective way, and the Internet has been radically changing the way and reducing the costs of managing and providing financial services (e.g. online banking). In countries like Bolivia, rural microfinance service institutions (i.e. FINRURAL) are establishing rural tele-centers as a means to expand their outreach, the service provided to clients, and an additional revenue source. In Sri Lanka, Sarvodaya, an NGO with an extensive financial and microenterprise service network (SEEDS) widespread throughout the country, is one of the partners of the VGK program competitively selected to establish a pilot tele-centers with distance education e-Learning facilities.



Local provision of community development services is a worthwhile activity deserving Government support. Tele-center sustainability should not be compromised in the process, as would happen if tele-center administration were burdened with the costs of delivering services that are not directly linked to tele-center operations. Support to different kinds of service are best kept separate, to enhance transparency and accountability and to stimulate efficiency in service delivery.<sup>7</sup> This approach is followed by the e-Sri Lanka's competitive grants, which seek to encourage innovative uses of ICTs in support of community development and poverty reduction.

### **e-Government at the Service of the Rural Poor**

The provision of services through the Internet makes sense only when the intended beneficiaries are regularly online. The provision of access to connectivity to ordinary citizens through tele-centers offers a window of opportunity. Government agencies will need to seize this opportunity to deliver, in a cost-effective manner, services that address the **specific** needs and constraints facing the country's rural poor. Some of the high payoff possibilities are discussed next.

These services need not be operated by Government directly and should not substitute private sector initiatives. Stiglitz, Orszag and Orszag [2000] give a useful set of rules to help determine when it is appropriate for Government to provide online services.

### **Increasing Access to Assets**

Farm land is the most important rural asset, and lack of access to land is a major determinant of poverty. Income from farming provides only 23.4% of household income among the poorest rural families engaged in agriculture, compared to 50% for agricultural families in the richest income quartile (Table 11).

**Table 11. Sri Lanka – Average Percentage Share of Different Sources of Income in Total Agricultural Household Income by Rural Expenditure Quintile 1999-2000**

Source of Income	Contribution of different sources by expenditure quintile (%)					
	Poorest	Second	Third	Fourth	Richest	Total
Agricultural	47.6	53.1	53.3	46.7	48.5	40.9
Farm	23.4	35.4	40.1	37.0	42.5	36.6
Casual Ag. Wages	24.3	17.6	13.2	9.7	6.0	13.4
Non-farm	36.9	32.0	29.6	39.5	32.2	33.9
Casual Non-Ag Wages	15.2	14.0	9.4	8.0	4.6	9.8
Public Salaries	6.5	8.9	12.2	19.9	26.2	15.4
Private Salaries	13.9	12.1	7.7	11.3	7.1	10.1
Sale of farm products <sup>1</sup>	1.0	0.7	0.9	1.2	1.4	1.0
Transfer	8.7	7.6	7.5	6.6	9.2	7.9
Samurdhi	7.3	6.4	4.3	3.1	1.8	4.4
Farm subsidies	0.2	0.2	0.1	0.1	0.2	0.2
Remittances	3.5	4.7	5.3	4.2	4.5	4.5
Other	3.4	2.7	4.2	3.1	5.5	3.8
Fisheries	0.1	0.1	0.2	0.0	0.9	0.3
Estate	1.0	0.8	0.5	0.3	0.1	0.5
<b>Total</b>	100.0	100.0	100.0	100.0	100.0	100.0

<sup>1</sup> Comprises sales of forest products and processed foods.

Source: World Bank [2003], page 8, based on Sri Lanka Integrated Survey (SLIS) 1999-2000.

About 80% of Sri Lanka's lands belong to the State [Ratnayake 2002]. Over the years these lands have been let for use under a variety of uncertain and insecure tenure arrangements [Ratnayake 2002]. Tenure insecurity prevents farmers from investing in land, to improve its productivity and grow higher value crops, and limits its value as loan collateral. The country's system of land administration needs to be made simpler, less expensive and less dependent on multiple institutions; thereby reducing the cost to farmers of gaining access to freehold land.

With World Bank assistance, the Government of Sri Lanka has started a pilot project to test new land titling procedures. The pilot is expected to increase tenure security, transaction efficiency and enhance title registry operations. With the new approach, the cost of titling a land parcel should be reduced by more than 60 percent, and the percentage of parcels with unresolved issues after adjudication that prevent titling is to be reduced by about 50 percent (Ratnayake [2002], p. 18).

- R1** Once these fundamental back office operations are fine tuned by the pilot, the on-line availability of reliable cadastral and land registry information through the Internet, could provide a boon to land market efficiency, and enable small farmers to identify lands with tenure security they may buy or rent.

## **Expanding Cost-effective Access to Services**

### *Education*

Sri Lanka's achievements in education, health and other social services are a remarkable testament to the country's long standing commitment to equity and social development (Table 10). School coverage is extensive, available to most rural school children. A Ministry of Education survey (reported in [2001] page 19) found that secondary school teaching of all subject matters up to GCE Advanced Level was available in 85% of the country's administrative divisions.

Present Government reforms seek to address the principal gaps outstanding: i) low quality of education, high failure rate and low school attendance – especially in the countryside, and ii) limited linkage between job market requirements and school curricula, reflected in high rates of unemployment of graduates at the higher levels of qualification (Ministry of Education [2001], p. 11). The National Policy on Information Technology envisages “the planning, implementation and sustenance of Information Technology Education in schools to enhance student's learning and quality of teaching” (Ministry of Education [2003], p. 2).

e-Sri Lanka will support the Ministry of Education's objectives in three concrete ways.

First, the distance/e-learning activities included under the Program will help raise the skill levels of school teachers and of a broad spectrum of the population at low cost.

Second, the build up of a network infrastructure and the establishment of VGKs in rural communities, will enable the provision of connectivity and computer services to rural schools.

- R2** Third, once VGK are in place, content online provided by the Ministry of Education can help enhance the quality of teaching and the educational curriculum.

## *Remittances*

Foreign remittances represent an important supplement to urban household incomes in Sri Lanka. In the case of the rural poor, domestic remittances are significant (Gunetilleke [2000], p. 10).

An e-MoneyOrder has been developed by the University of Colombo in partnership with the Postal Service and support of an ICTA competitively awarded grant. Its first trial application is underway, to remittances by university applicants to pay their exam fees.

- R3** Once refined and expanded, the e-MoneyOrder combined with connectivity through tele-centers, could make it easier and stimulate an increase remittances to the country's rural poor.

## **Strengthening the Bargaining Power of Farmers**

Small farmers have a weak bargaining position vis-à-vis intermediaries buying crops at the farm gate.

Government programs like the Paddy Marketing Board, the Multi-Purpose Cooperative Societies and the retail outlets of the government owned Sathosa Retail, Ltd., have not been successful in significantly improving the prices received by farmers or in mitigating the adverse impact price instability. The establishment by the Central Bank of Forward Sales Contracts has also helped, but these are presently traded in a very thin market.

An ICTA sponsored project, has developed a Govi Gnana (Farmer Knowledge) System to increasing the transparency, accuracy and timeliness of price information on about 130 vegetable products traded in the spot markets at Dambulla Dedicated Economic Zone (DDEZ) and in the smaller the Meegoda Dedicated Economic Zone (MDEZ) [de Silva 2004]. Local traders have agreed to feed the system, to improve performance and compete with other markets. The system is also supported by 3 investigators with PDAs roaming around the market verifying the information provided. Centrally located gigantic screens broadcast the information and have become popular among farmers visiting the markets.

- R4** Once the VGKs are in place, the spot price information gathered by the Govi Gnana system at the DDEZ and MDEZ broadcast via the Internet will inform and strengthen the bargaining position of farmers in their dealings with local traders.

## **Expanding Off-farm Work Opportunities**

The rural population is highly dependent on off-farm income, especially from non-agricultural employment. Wage earnings and non-farm income account for 61% of the income perceived by Sri Lanka's poorest agricultural families (Table 11).<sup>8</sup> The bulk of these meager earnings come from agricultural and non-agricultural wages and salary work (53.4%). Public salaried work accounts for 26.2% of the income of the richest agricultural households; but the potential for expanding this form of employment is limited. The remaining sources of non-farm income earning opportunities are not very important for high income rural families, a reflection of limited rural opportunities for non-farm work.

With markets shifting rapidly and jobs increasingly temporary, a key labor policy objective should be to increase labor market efficiency and reduce the amount of time a worker spends unemployed in between jobs. [Accenture 2002, page 21] highlights as

good e-government practices the job market sites in Australia ([www.jobsearch.gov.au](http://www.jobsearch.gov.au)), Canada ([www.hrdc.gc.ca](http://www.hrdc.gc.ca)), and the US ([www.ajb.org](http://www.ajb.org)). This is the kind of public service justifiable mainly on equity grounds. As often happens where connectivity is limited, Sri Lanka does not have a well developed online labor exchange system.

- R5** Once the VGKs are in place, online public service labor market exchanges directed at low income wage earners will facilitate job search, help reduce length of unemployment and increase income earning opportunities for rural residents.

## Enhancing Productivity

### *Farming*

The productivity of the dominant activity in rural communities, agriculture, is very low compared to the industrial and service sectors (Table 12). Agricultural productivity is lowest in the two provinces with the highest proportion of poor households, SabaraGamuva and Uva. Yields in the staple food rice have increased to about 3.2 t/ha in 2000, but diversification to higher value crops (e.g. fruits and vegetables) has been slow, and rice and cereals still occupy two thirds of total cropped area.

**Table 12. Incidence of Poverty by Province (2002), and Labor Productivity Indexes in Sector/Region as a Proportion of National Total (1996-1997)**

Province	Percentage of poor households (2002)	Labor productivity Indexes (1996-97)			
		Agriculture	Industry	Services	GDP
Western	9.2	66	134	184	151
North Western	22.3	92	98	109	99
Central	20.8	51	93	108	78
SabaraGamuva	28.9	43	108	100	75
Southern	23.6	53	55	104	70
Uva	31.8	57	64	96	78
North Central	22.3	45	42	114	72
<b>Total</b>	<b>19.2</b>	<b>57</b>	<b>106</b>	<b>140</b>	<b>100</b>

Sri Lanka's Department of Agriculture pilot Cyber-extension project is outfitting seventeen pilot extension offices with computers and connectivity. The existing technical knowledge-base has been collated into 14 CD ROMs covering a practical knowledge on a variety of crops - rice, big onion, red onion, maize, chillies, potato, sweet potato, manioc, banana, papaw, Anthurium, mushroom, tomato and brinjal. The project envisages training of extension agents and village extension workers, and enabling farmers to bring live samples to the extension unit for photographing or scanning, and chatting with experts about specific technical problems they are facing [Dept. of Agriculture, 2004]. Expansion to cover the whole country is expected to follow the pilot phase.

- R6** Once the tele-centers are in place, the effectiveness of the cyber-extension system will be greatly enhanced. Farmers will be able to benefit from the knowledge base that has been developed, and from direct consultation with extension agents and Department of Agriculture specialists.

## *Rural Entrepreneurship*

Networks are essential for entrepreneurial development and enhancing the productivity of small firms. At the early stages of a business, family and friends give support to the entrepreneur helping him generate the initial concept and business model and even raise initial investment capital. As the firm begins to operate and develops, other kinds of networks become important. Some provide important inputs – e.g. banking and financial entities - while others help expand his sales opportunities and improve productive techniques – trade fairs, training institutions.

Premaratne ([2002], pages 23-25) lists some of the principal networks providing services in support of micro, small and medium entrepreneurial development in Sri Lanka<sup>9</sup>:

Ministry of Youth Affairs and Sport, mainly through its Small Entrepreneurship Development Division and the National Youth Cooperatives,

Ministry of Tourism and Rural Industrial Development, Department of Small Industries, Industrial Development Board, Sri Lanka Handicrafts Board, National Design Center,

Sri Lanka Export Development Board

Department of Textile Industry

Sri Lanka Business Development Centre

Small and Medium Enterprise Development Project (German Cooperation)

Federation of Thrift and Credit Co-operative Societies or SANASA movement with extensive network of credit and credit and loan facilities, training and education, marketing, and insurance facilities for small mainly rural entrepreneurs.

SARVODAYA Economic Enterprise Development Services (SEEDS).

Weak rural markets for technical, marketing, and training services have motivated government involvement in the provision of business development services to improve the productivity and viability of small firms [Overy 2002]. The Internet offers a low-cost means of providing these services, in an especially effective way when combined with face to face assistance.

Two promising areas are: the expansion of regular transactions – applications and forms online, and the provision of technical assistance directed at small and medium size firms on short notice via e-mail or chat.

**R7** The ICTA, through the e-Government component of e-Sri Lanka, is engaged in identifying forms to be made available online. The next step is the simplification of a broad range of citizen to government transactions and enabling citizens to carry out these transactions online. (See, for example, the award winning Chilean site: [www.tramitefacil.cl](http://www.tramitefacil.cl)).

**R8** Some Sri Lankan agencies are already offering valuable technical material – mainly technical papers and short pamphlets online. Once the tele-centers are in place, small entrepreneurs will be able to draw on Sri Lanka's network of support agencies, to obtain high quality personalized fast-response online technical assistance.<sup>10</sup>

In Sri Lanka, the cyber-extension initiative being developed by the Department of Agriculture could be combined with the capabilities of other agencies to provide a single-entry point into a comprehensive technical assistance system of support to the country's small and microentrepreneurs.

A web portal for SMEs (<http://sme.nccsl.lk/index.asp>) that provides an electronic correspondence mechanism for obtaining online advice and technical assistance is presently being developed by the Federation of Associations of Small and Medium Enterprises of Sri Lanka with ICTA support.<sup>11</sup> Once completed, the web portal will host over 200 SME web pages, providing a on-line marketing tool for each of them. It is envisaged that 5 regional access points will also be established to disseminate the information.

## THE CHALLENGES

*"We have seen over the years that millions of rupees are spent on tele-center initiatives at public schools and other places and most of the times the computers just idle in the rooms without being touched..." Wanninayaka [2004], p. 56.*

The VGK Program will need to overcome four critical challenges.

First, it will need to encourage use of ICTs by lowering user and online service costs, by increasing the value that citizens derive from ICTs, and by raising public awareness of benefits.

Second, it will need to develop the country's telecommunications backbone at a reasonable and affordable cost.

Third, serving the chronically poor will require inventiveness and special incentives.

Fourth, interagency cooperation and involvement of civil society stakeholders will be a key ingredient that will nevertheless be challenging to implement in practice.

### **Increasing the Value of ICTs, Promoting Low-Cost Software, and Raising Awareness**

Table 13 shows a projected cash flow for a typical 4-computer VGK. As is common for Sri Lankan urban cybercafes, most tele-center revenues will at first come from telephone services. Over a ten-year planning horizon, the rate of return of a typical VGK may reach 6%. It could be higher, provided that Internet and computer services gain importance as revenue generators.

**The first and foremost challenge to be faced by the VGKs will be to make productive use of the computer and Internet facilities.** Addressing the challenge will require: meeting local language needs, promoting low-cost software development, raising awareness of the value of ICTs and establishing a strong network of operators who can maintain VGK systems and interact with the community as agents of change.

### **Language**

About 74% of Sri Lanka's population are Sinhala. Tamil speakers account for 25% of the population.<sup>12</sup> The official national languages, are Sinhala and Tamil. English is commonly used in government and is spoken by about 10% of the people, mainly in urban areas. (Williams [1995])

Large entrepreneurs work in English, and most software and information systems run in English. Present users assume that in order to use computers, people need to learn English. In practice, literacy rates are high but most small businesses, government employees and individuals work in their own language. Most students study in their own language, either Tamil or Sinhala, or English in the case of a small minority comprising mainly Eurasians. Less than 10% of computer users in Sri Lanka use Sinhala or Tamil, and the applications run in local languages are limited to Word processing and publishing (Dias [2003]).

Table 13. Prototype Cash Flow (US\$) - 4 Computer Telecenter

Total hrs per year	Price US\$/hr	Invest. Yr US\$	Year 1			Year 2			Year 3			Year 4			Year 5			Year 6-10			
			Occ %	Hours	US\$	Occ %	Hours	US\$	Occ %	Hours	US\$	Occ %	Hours	US\$	Occ %	Hours	US\$	Occ %	Hours	US\$	
<b>Revenue</b>																					
Telephone					2,964			3,120			3,276			3,432			3,588			3,588	
Internet																					
Morning hours	4,608	0.6	10%	461	276	25%	1,152	691	40%	1,843	1,106	50%	2,304	1,382	60%	2,765	1,659	60%	2,765	1,659	
Evening hours	6,912	0.75	35%	2,419	1,814	50%	3,456	2,592	60%	4,147	3,110	70%	4,838	3,629	80%	5,530	4,147	80%	5,530	4,147	
Sub-total					2,091			3,283			4,216			5,011			5,806			5,806	
<b>a</b>	<b>Revenue projections</b>				<b>5,055</b>			<b>6,403</b>			<b>7,492</b>			<b>8,443</b>			<b>9,394</b>			<b>9,394</b>	
<b>Operating expenses</b>																					
Connectivity					2,400			2,400			2,400			2,400			2,400			2,400	
Rent					600			600			600			600			600			600	
Utilities					480			480			480			480			480			480	
Staff					1,440			1,440			1,440			1,440			1,440			1,440	
Equipment replacement								958			958			958			958			958	
Insurance					400			400			400			400			400			400	
Other					490			490			490			490			490			490	
					<b>Subtotal</b>			<b>5,810</b>			<b>6,768</b>			<b>6,768</b>			<b>6,768</b>			<b>6,768</b>	
<b>VGK Installation Investments</b>																					
Equipment & software		5,321																			
Air conditioning		200																			
Office furnishings		200																			
		<b>Total VGK Investment</b>			<b>5,721</b>																
<b>b</b>	<b>Unsubsidized cash flow:</b>				<b>(5,721)</b>			<b>-755</b>			<b>-364</b>			<b>725</b>			<b>1,676</b>			<b>2,627</b>	
<b>Subsidies</b>																					
Connectivity					2,400			2,400			1,600			800			-			-	
Equipment & software		5,321																			
<b>c</b>	<b>Subsidized cash flow</b>				<b>(400)</b>			<b>1,645</b>			<b>2,036</b>			<b>2,325</b>			<b>2,476</b>			<b>2,627</b>	
<b>Implementation subsidies</b>																					
Network/Commitment/Training fee					1,500			833			833			833			2,000			-	
Certification					100			100			100			100			100			-	
<b>d</b>	<b>Subtotal</b>				<b>-</b>			<b>1,600</b>			<b>933</b>			<b>933</b>			<b>933</b>			<b>2,100</b>	
<b>e</b>	<b>Unsubsidized Cash Flow</b>				<b>-5,721</b>			<b>-2,355</b>			<b>-1,298</b>			<b>-209</b>			<b>742</b>			<b>527</b>	
	(b - d)																				
	<b>Rate of return (unsubsidized cash flow)</b>				<b>6.0%</b>																



Enabling the use of Sinhala and Tamil will be a key determinant of VGK program success. Tamil speakers will benefit from content development in Southern India, but content and applications in Sinhala are negligible. Expanding English education may be a long term option,<sup>13</sup> but in order to expand computerization and ICT literacy swiftly, users will need immediate support in the local languages.

A focus on local language service is also needed to give a boost to Sri Lankan entrepreneurs providing content in Sinhala and Tamil. In the Republic of Korea, for example, the language uses no Latin characters and very few Koreans are fluent in English. Nevertheless, the top ten websites visited by Korean Internet users are Korean language sites, and very few Koreans surf non-Korean websites (ITU [2004], p. 11).

Ongoing ICTA efforts to develop standard keyboard, fonts and Unicode representations of Sinhala characters are indispensable first steps ([www.fonts.lk/index.html](http://www.fonts.lk/index.html)).

- R9** Every computer in the VGKs will be equipped with a keyboard enabling users to work in Sinhala, Tamil and English.

## **Software**

Software products are generally subject to network economies that make an application rise in value rapidly as the number of users increases. This leads to winner-take-most markets, where a single enterprise achieves overwhelming dominance. Consumers become captive or “locked” into a single technology, because everyone uses this technology and the costs of shifting and learning to use alternative products are high [Shapiro y Varian 1999].

Network effects are highest where a significant investment in a proprietary technology is already in place. This is hardly the case in Sri Lanka where e-government and computerization is just starting.

Three kinds of software will be required to support the tele-center program: i. e-government portals and service delivery systems; ii. common desktop office applications; and iii. community networking and online collaboration software. The e-Sri Lanka program can prevent technological *lock in* and help serve the requirements of the tele-center program through a judicious cost-effective use of open source software.

A distinction between different software markets is in order. The most successful open source systems - Perl, Linux, Apache, PHP – are used primarily by information technology specialists, who value the ability to make changes in the code to suit specialized needs (Evans and Reddy [2002], Franke and von Hippel [2002]). Many e-government applications fall in this category: the possibility of modifying code is valuable to public agencies developing their online service applications. It can enable an agency to share code and coordinate developments with other agencies, without having to reinvent the wheel or pay hefty proprietary fees.

In contrast, the much larger market for desktop applications – spreadsheets, word processing, presentation, publishing - is made up of people interested in ease of use and the standard features of an application. Their desire or technical capability to alter code is for the most part negligible. The costs of shifting from one technological platform to another are generally high for users of desktop applications.<sup>14</sup>

Networking and online collaboration software is in a separate class. Most community group members are not expert users. They use of mailing lists and interact with other members to achieve social and economic objectives, and rely on administrators or webmasters to manage the software. The costs of shifting technologies is not an overriding concern to community group members, but the availability of a system that meets Sri Lankan requirements and that can be occasionally upgraded at low cost is.

### *e-Government Systems*

Public intervention in support of e-Government under an open source platform may be justified on social welfare grounds [Comino and Manenti 2003]. The Internet is a prime example of a “government” sponsored development, a public good, made freely available for use by the public. The Hypertext Markup Language (HTML) exemplifies a successful software, available in the public domain continuously upgraded by a consortium of corporations, research groups, non-profit organizations and governmental agencies.

The Open Source movement has often promoted “viral” licenses that discourage innovation by preventing subsequent developers from making a profit. A software developed under the GPL license, for example, requires that any future developments built from the original software must be distributed freely with full access to the code.

Governments, however, need not follow a restrictive license regime. Some licenses enable government agencies to make the software developments they sponsor freely available, but also allow private entrepreneurs to use the code and sell improvements under a proprietary license (Schmitz and Castiaux [2002], Hahn [2002]).<sup>15</sup>

**R10** Software developed with Sri Lanka government sponsorship should give consideration to open source solutions, particularly if these developments are potentially useful to other members of society or to government dependencies. These developments should be subsequently made available for use by third parties (e.g. through an online software code sharing repository<sup>16</sup>), under a license that enables further development and reasonable commercial exploitation.

Some governments are making large scale migrations from proprietary to open source software. The small Municipality of Extremadura, Spain was perhaps the first to make the move [Cobo 2004], but major cities like Bergen [Znet 2004], and Barcelona [InformaticaPublica 2004] have followed. Munich [Libbenga 2004] and Paris [Lettice 2004], are also considering migration of most of their systems, including desktop applications, to open source. The Government of Brasil will reportedly migrate 80% of its computers to Linux [Miyajima 2004].

Little is known about the extent of these migrations, the legal risks involved,<sup>17</sup> the kinds of software products and the interoperability of the open source software adopted with other software and hardware products in use, all of which are crucial determinants of migration costs.

Use of open source, however, need not be an all or none proposition.<sup>18</sup> Where a wholesale shift in software technology is not practicable, significant economies may still be achieved by sharing selected open source applications. In the US, the States of Massachusetts, Rhode Island, Pennsylvania, Utah, Kansas, Missouri, West Virginia, and the cities of Gloucester, MA, and Newport News, VA, have formed a Government Open Code Collaborative Repository to enable open source software code sharing by government agencies ([GOCC 2004], Kriss [2004]). The municipalities of Extremadura and Barcelona, in Spain, and Porto Alegre, have established a similar network to exchange experiences and software developments [PortoAlegre 2004]. A similar initiative has been proposed for the EU [Schmitz and Castiaux 2002].

e-Government efforts have often resulted in “data dungeons” that do not interact with each other. These disparate systems reside in different agencies and become outdated rapidly. They tend to rely on proprietary software that do not conform to open standards. Interconnection may be achieved, but at a significant cost.

Great Britain has adopted a flexible open source policy [Cabinet Office 2002].<sup>19</sup> The UK has also adopted an e-Government interoperability framework to which all government dependencies must adhere. The proposed architecture mandates the use of on open standards, e.g. XML, by all government agencies [Office of the e-Envoy 2004]. Proprietary software is not excluded, provided that it meets the open standards.<sup>20</sup> Similarly, Brasil’s interoperability architecture (*e-ping*), envisages the occasional need to use proprietary software, but will rely mainly on open source solutions and open standards [Governo Brasileiro 2004].

A rapid expansion in e-government applications is imminent in Sri Lanka. e-Sri Lanka presents an exceptional opportunity to expand systems rapidly and to avoid duplications and locking the country’s e-government services into proprietary technologies that could prove to be costly. It is an opportunity to be seized and planned for.

- R11** The formation of a Task Force on Open Source and Interoperability in e-Government applications bringing together senior IT officers from ministries and agencies planning e-Government systems is recommended. The first order of business should be the drafting of guidelines for the development, use, and sharing of low cost interoperable applications across public agencies.

### *Desktop Applications*

Technological lock-in in desktop applications started in high income countries when the software industry was still in its infancy. Desktop systems have since become quite sophisticated in functionality and interoperability. Businesses are resisting expensive changeovers to new versions that exhibit only minor changes in functionality. This is especially true of the standard office desktop applications – spreadsheet, word processing, presentation and desktop publishing, for which robust free downloads or inexpensive alternatives are widely available.

The leading open source office suite, Open Office ([www.openoffice.org](http://www.openoffice.org)), may be downloaded for free. It is rich in features, and its files are readable by other leading vendor office suites. Because it is available in common operating system platforms, i.e. Windows, Macintosh, Solaris, Linux, and FreeBSD, the decision to migrate to OpenOffice may be considered separately from the decision to change operating systems. This is important for desktop applications because software offers are larger for Windows than for Linux. OpenOffice is available in more than 33 languages, including Tamil, but, remarkably, it is not available in Sinhala.<sup>21</sup>

Since 2001, the city of São Paulo has run a tele-center program under an open source environment – including operating system (Linux) and desktop applications ([www.telecentros.sp.gov.br/english/tele-centers.php](http://www.telecentros.sp.gov.br/english/tele-centers.php)). The city presently sponsors 107 tele-centers, all located in the most impoverished parts of the municipality, showing that inexperienced users can perform well in an open source environment. Sao Paulo’s program has served as a model for Brazil’s nationwide 3,200 tele-center program, presently under implementation.

Most Sri Lankans using computers – 1.3% of the population in 2002 according to Table 1 - are English speakers and use proprietary software.<sup>22</sup> For these few well off individuals, the costs of shifting to another software technology are high, even if insignificant from the standpoint of Sri Lankan society considered whole. Their views carry weight because most decision-makers fall in this category.

A dependency on proprietary software in desktop systems should probably not be forced upon the vast majority of Sri Lankans who do not speak English, have no vested interest or training in the dominant technologies, have limited income, and will be the ones to pay the most if an expensive proprietary software platform is adopted – either by design or by default - by the e-Sri Lanka initiative.

They may well not pay, even if the proprietary standard becomes widespread either by design or by default. Pirate software is commonplace in developing countries (Table 14). Policing small shopkeepers, cybercafe operators or individuals is impractical, and the changing of cultural norms and attitudes regarding intellectual property rights could significantly hurt Sri Lanka’s budding local software industry.

e-Sri Lanka’s tele-center program envisages the installation of low-cost software in all of the VGKs. To make this effective, open source software options need to be made available.

**R12** Standard Sinhala fonts developed under e-Sri Lanka, should be software platform independent (i.e. not tied to proprietary software).

**R13** It would be beneficial if a Sinhala version of the OpenOffice desktop applications suite is developed under the umbrella of the e-Sri Lanka initiative, for distribution to the VGKs.<sup>23</sup>

**Table 14. Piracy Rate in Asia-Pacific Countries and World Wide**

<b>Piracy Rate in Asia-Pacific Countries</b>
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Country	Piracy Rate %	Country	Piracy Rate %
China	92	Korea	48
Vietnam	92	Singapore	43
Indonesia	88	Taiwan	43
Pakistan	83	Australia	31
Thailand	80	Japan	29
India	73	Australia	31
Philippines	72	Japan	29
Malaysia	63	New Zealand	23
Hong Kong	52	Other AP	76
Piracy Rate by Region			
Region	Piracy Rate %		
Asia-Pacific	53		
Eastern Europe	71		
Latin America	63		
Middle East/Africa	56		
US/Canada	23		
Western Europe	36		
<b>All Regions</b>	<b>36</b>		

**Piracy rate:** Number of pirated software units divided by total number of units put into use.

**Source:** BSA-IDC [2004]

### *Community Networking*

Software to establish mailing lists, web pages and enable resource sharing, is a most valuable tool for empowering rural communities and encouraging collaboration online (Oksa and Turunen [2000], p. 7).

There are powerful proprietary software options (e.g. First Class, Lyris), some highly specialized (e.g. Blackboard for education content management). There are also open source list servers (PHPList) and web page creation programs (Postnuke). Existing online services like Yahoo Groups (<http://groups.yahoo.com/>) and Dgroups ([www.dgroups.org](http://www.dgroups.org)), have limited functionality but are presently available for free. What appears to be missing is an integrated low-cost system, available in Sinhala and Tamil, suited to information exchange and user friendly web page creation by small community groups in Sri Lanka.

The VGK Program will need to support the development of an Open Source **Community Portal and Networking Software**.<sup>24</sup> This Portal and Networking Software would enable the ICTA to establish and host its own VGK portal to serve the networking and local content posting needs of the e-Sri Lanka's VGK community (all VGKs operators and VGK users). The proposed Community Portal and Networking Software will have characteristics similar to those of [www.DGroups.org](http://www.DGroups.org), but with the following **additional** features:

The software will be developed using Open Source software, under a non-restrictive license regime.

The software will enable the use of Sinhala, Tamil and English and the corresponding standard fonts, as optional languages of communication between users.

The Community Portal and Networking Software will make it possible for different institutions – community groups, schools, small businesses - using the software to have their own distinct unique Portal *shell* with its own logo and banner.

The software developed should be easy to use and run directly and independently by individual user groups, requiring no intervention of any external institution.

The Community Portal and Networking Software software developed will have a separate section for simultaneous chatting by registered group members, through a Web page interface within the system.

**R14** Support the design of the detailed specifications and the development of an open source **Community Portal and Networking Software**.

**R15** The possibility of joining forces to develop the Community Portal and Networking Software with other institutions engaged in similar open source software developments (e.g. Bellanet, Jamaica Information and Communications Technology Project, Universidad de la Frontera in Chile) should be explored.

**R16** During a transition period, while the Community Portal and Networking Software is under development, it is proposed that Dgroups help meet the immediate local interaction needs of the VGKs. For this transition period, the feasibility of developing interfaces in Sinhala and Tamil should be considered.

## **Raising Awareness**

The VGK program's first line of attack for raising citizen awareness of the value of ICTs will be secondary students. Students are an ideal target group. Youngsters are known to be the first to take up information technology, and to use it to communicate with friends and to do their school work.

### *Targeting Schools*

Enabling local school use of the VGK facilities during the morning hours of service is part of the VGK program.

**R17** It is proposed that every VGK operator be able to approach the local school administrator and offer the use of the VGK facilities for educational purposes, during up to 4 hours in the morning every school day. The voucher program will provide a subsidy to the school, equal to the cost of these four hours, discounted by about 20% (to keep the value of the subsidy in check and to account for the lower commercial value of morning computer/Internet time). In order to qualify for the school voucher subsidy, school administrators will need to: i) make sure that at least one of his teachers is properly trained (for which funding is also provided under the project), and ii) secure written endorsement from the local parent teacher association.

Without the proposed school voucher subsidy, the levels of use of the computer and internet facilities in the first few years of operation would probably be lower than projected in Table 13, and sustainability would be more difficult to achieve. The voucher subsidy award process has been structured in a least bureaucratic way, so that it can be handled locally, by the VGK operator, the local school administrator and the local parent-teacher association.

#### *Targeting Selected Users*

Given the mature age structure of Sri Lanka's population, raising citizen awareness of the value of ICT use will require targeting adult users. The more educated rural residents, in particular, are likely to find immediate value in using ICTs: Government officials, small business persons, NGOs and special interest groups.

Unlike children and youngsters who take up the technology with minimum effort, especial training will be needed to generate amongst this target group of users a basic familiarity and proficiency in the use of computers and the Internet, and to raise awareness of the value and potential of tele-centers to empower communities, small entrepreneurs and disadvantaged groups.

Three kinds of training and awareness raising activities are envisaged within the e-Sri Lanka program: i. basic computer literacy training program covering similar ground as the international computer driving license ([www.cssl.lk/computer\\_driving\\_license.htm](http://www.cssl.lk/computer_driving_license.htm)); ii. a practice voucher program, to increase familiarity and enhance proficiency of adult tele-center customers, particular those in leadership positions (e.g. teachers, heads of NGOs, local government officials); and iii. an e-society initiative, to facilitate innovative ICT uses to reduce rural poverty.

**R18** Facilitate the design and implementation of a basic computer literacy training program, targeting government officials, small business entrepreneurs, housewives and leaders of NGOs and special interest groups.

**R19** Design and implement a subsequent practice voucher program to enable ICT literacy trainees become familiar and proficient in the regular use of tele-center services to meet their every day requirements.

### **VGK Operator Training**

Tele-center operators will play a key role in the program, covering three kinds of activities (Garrido, Morales and Villarroel [2003], Colle and Román [2003]):

**administrative:** charge for services, keep accounts, market services, keep costs in check and develop new sources of revenue, liaise with local schools to implement morning service with schools, help administer voucher subsidy program;

**technical:** operate and maintain the equipment, mediate between users and technology (software and hardware);

**agent of social change:** liaise with communities, help develop local content, train community leaders in ICT use, encourage formation of community networks.

The start up phase will be a challenge for VGK operators, particularly with respect to technical expertise. The VGKSI's can help meet this challenge through a combination of distance and on-site training, coupled with peer to peer support through a virtual network of operators. The ICTA has already designed a ICT capacity building toolkit for the use of Tele-Center operators and community ICT champions.

**R20** A complementary tele-center operator training program will be designed and implemented, based on the ICT capacity building toolkit, and also drawing on the program's 8 distance e-learning centers combined with face to face sessions. The program will also promote feedback and knowledge-exchange amongst VGK operators and VGK SI's.

### **Achieving Low Connectivity Costs**

The cost of connectivity in rural areas has been a major deterrent to ICT development in Sri Lanka and will continue to be a major determinant of tele-center sustainability in the future (first item in Table 6). A major challenge facing the country, and the ICTA as implementing agency, will be **to design a competitive subsidy award for the development of the infrastructure that provides the connectivity that will be needed in the foreseeable future at a reasonable cost.** Given the present situation in the telecommunications sector, this a formidable challenge.



## **The Telecommunications Sector and Regulation in Sri Lanka**

Sri Lanka Telecom (SLT), is the country's dominant operator. It was privatized in 1997, when the Nippon Telegraph & Telephone Corporation (NTT) of Japan purchased a 35% stake in the company and by public shareholders who in December 2002 acquired an additional 12% stake. Currently the Government of Sri Lanka holds 49.5%, NTT holds 35%, public shareholders own 12% and employees have a 3.5% stake. SLT revenues represent about two thirds of total phone revenues. It has a formal monopoly over wireline services and in 2002 controlled 83.6% of the market. It also controlled 40% of the mobile telephone market, and is the country's leading Internet Service Provider. Practically all of the country's Internet communications go through SLT's fiber optic ring that services Colombo and links major towns to the capital. SLT's revenues in 1999 were equivalent to 1.7 percent of Sri Lanka's GDP [Jayasuriya and Knight-John 2002]. SLT's market power is considerable, as is also its political influence.

SLT has also acquired Mobitel raising concerns on possible cross-subsidizing in the absence of a strong regulator. SLT has also given signs that it could take over Lanka Bell – one of the 3 fixed operators. These developments heighten concerns on competition in the industry. Non-facilities based operators have had a tough time getting access to SLT's backbone. Not a single one of the External Gateway Operators who did not have an existing network were able to get into the liberalized market after the removal of the international monopoly. It was only in 2004 that VSNL, an Indian operator, finally got interconnection paying a gateway license fee of US\$ 50,000.<sup>25</sup>

Telecom regulation of local telephony is a difficult undertaking, in any setting. Since 1996 the US has been trying to deregulate its local telephone market with very limited success. Other developed countries have not fared much better. Dominant operators everywhere resist the effort of regulators to open up their infrastructure facilities for lease to new entrants.

Telecommunications regulation is difficult everywhere, but is particularly challenging in Sri Lanka where Government institutions do not work well.<sup>26</sup> A review by Knight-John ([2002], page 27) concludes that "regulatory failure, stemming from systemic weakness in policy formulation and implementation and in the institutional and legal structures governing competition and regulation, is rampant."

Facilities based competition is preferable to service based competition, even if it requires the duplication of facilities and is therefore costly in the short term. Dominant operators have a strategic edge during negotiations regarding interconnection agreements for sharing the infrastructure under their control. They can affect the quality of service of competitors using their own facilities. They behave strategically when facing the prospect of a new entrant building new infrastructure that could potentially challenge their monopoly over facilities [Borreau and Dogan 2003].

In Sri Lanka, all of the licenses granted by the Sri Lanka's Regulatory authority have been non-facilities based gateway licenses that force new operators to use the international switches of the four facilities-based licensees. According to the 2004 report of the Office of the US Trade Representative:

"SLT and the two wireless operators have formed an unofficial cartel to control local gateways and restrict interconnection to other operators. This has adversely affected the operations of other telecom and Internet operators and new international gateway licensees who are unable to make use of their licenses due to lack of interconnection by the three local exchange operators."

Efforts to promote facilities based competition have been more successful and sustainable through asymmetric regulation; i.e. by placing restrictions on the incumbent and providing incentives to new entrants to construct their own infrastructure networks (Kiesling and Blondeel [1999], Coloma and Tarziján [2002]). In the UK, a country where regulation has favored facilities-based competition, non-dominant carriers have gained a 15.4 percent share of the local telephone market; compared to only 5.4 percent penetration in the US, where network unbundling and services-based regulation has been dominant (Woroch [2002]).

## **Lessons of Experience**

Most of the countries that have achieved significant broadband penetration are small, urbanized and high income; e.g. Hong Kong, Singapore, United Arab Emirates.

The Republic of Korea is a notable exception. Korea has a high income but it is a large country of 40 million people with one of the highest rates of high speed connectivity among OECD countries. About 43% of Korean households are connected to an average of 4 Mbits (ITU [2003]), and pay only about US\$ 50/month (ITU [2004]).

What accounts for Korea's success?

First, the government helped develop the backbone by becoming the major client for broadband services (KII-G). Before competition began in earnest, the country was well served with fixed wire telephony. From 1995-1997 Government gave loans to the two facilities based service provider, KLT and DATACOM, to roll out fiber to serve 80 cities. In exchange, the operators repaid these loans by providing connectivity service to 10,000 government offices (Tcha et al [1999], page 6). The operators established their own private service network alongside but were required to lease their facilities to new entrants at the pre-set government price.<sup>27</sup>

Second, the dramatic fall in prices and fast broadband roll out was the direct result of facilities-based competition actively promoted by the State. Thrunet began to offer cable modem service in July 1998. Then in April 1999 Hanaro offered optic ADSL and cable modem service. KTL had been promoting ISDN to profit from its infrastructure, but, threatened with a loss of market, started offering copper ADSL in December 1999 (Lee [2002]). At present, seven facilities-based operators offer customers various options. About 90% of Korean households have access to broadband through ADSL, and 57% through cable modem. Apartment LANs and wireless technologies cover 9%.

Third, Korea is highly urbanized. Eighty percent of the population lives in cities or large towns. Apartment buildings of 600 units and more are commonplace. A dense population makes the fast roll out of broadband infrastructure a low-cost undertaking. Construction companies own the local area networks in buildings, and government helps through a certification system that rates Apartments according to broadband speed (Yun, Lee and Lim [2002]).

Fourth, demand encouragement by Government and operators has been vital. Economic crisis befell the country right after the big broadband expansion. Multi-layer online gaming – more than 21,000 PCBangs as of 2001, helped absorb the broadband and stimulated residential demand (Heejin and Choudrie [2002], Aizu[2002]). Government also carried out massive informatization campaigns focused on key target groups (e.g. students, government, the military and housewives).

South Korea's experience is not entirely suitable as a model for Sri Lanka. Korea's income per capita is much higher (US\$ PPP 16,950 in 2002 compared to Sri Lanka's US\$ PPP 3,750 – UNDP [2004]). Korea's population is 80% urban, whereas Sri Lanka's is 80% rural. A higher income increases the capacity of the market to bear the costs of broadband deployment; while a less concentrated population makes the cost of such deployment more expensive.

Selected Latin America and Caribbean countries are making significant achievements in rural telecommunications service development. Their income and population density are closer to Sri Lanka's, and to e-Sri Lanka's chosen mode of infrastructure support. The reverse auction with subsidies awarded to operators who offer to deploy the infrastructure at the lowest subsidy, has been most widely used in Chile, Colombia, and Peru, and subsequently emulated in other countries of the Americas (Table 15).

**Table 15. Selected Features of Recent Rural ICT Development Least Cost Subsidy Auctions in Latin America and the Caribbean**

(page 1 of 2)

Country & Date of Tender	No. of tele-centers			No. computers/ Centre	Connection speed/Cost	Status
	centre/ Cluster	No of clusters	No. of centers			
<b>Chile</b> Population 18.7 million GDP/cap (US\$ppp)= 8652 Literacy rate= 91.4 HDI rank 81 (index= .735)	4	2	8	at least 4 computers (at least 1 with CD burner)	Minimum speed <b>128 Kbps</b> between tele-center and ISP (both ways); plus 32 Kbps for each additional computer installed.  Price fixed at customer level.	<b>- June 2002 Tender Documents (awarded and under execution.)</b> - This is 2 <sup>nd</sup> Tele-center program. Have had many rural telephony programs. - Total No. of tele-centers in 2002-04: 1,400
	5	3	15			
	6	7	42	minimum space of site where computers are to be placed: 20 m <sup>2</sup>		
	7	6	42			
	8	9	72			
	9	6	54			
	10	2	20			
	<b>35</b>	<b>253</b>				
<b>Brasil (2003-2004)</b> Population 174.1 million GDP/cap (US\$ ppp)=7360 Literacy rate = 87.3% HDI rank 75 (index= .777)	3200			Average of 5 computers per center.	Broadband 256 Kbps service using VSAT, Free of charge to users and local operators over 22 month service period.	Project under execution 2003-2004.
<b>Colombia COMPARTEL (Tele-centers)</b> Population 41.4 mill GDP/cap (US\$ppp)= 5749 Literacy rate= 95.3 HDI rank 62 (index= .765)	Several contracts, over 1000 centers already operating.			1 to 12 computers depending of contract	Effective navigation speed of 6 – 7 Kbps. Price fixed at customer level: US\$ 1/hour	Several contracts awarded in 2001-2003.
<b>Colombia COMPARTEL (Broadband for Public Agencies)</b>	To serve 3,000 schools, 624 local gov., 120 hospitals and 30 military garrisons.			1,372 with 3-4 computers 592 with 5-8 computers 691 with 9-12 computers 1,119 with 13-16 computers	<b>No. PCs Access (kbps) Navigation Download (kbps)</b> 3-4      128      48 5-8      128      64 9-12     256      96 13-16    256      128	Tender documents issued March 2004. Award to be announced in July 2004.

**Table 15. Selected Features of Recent Rural ICT Development Least Cost Subsidy Auctions in Latin America and the Caribbean**

(page 2 of 2)

<b>Country &amp; Date of Tender</b>	<b>No. of tele-centers</b>	<b>No. computers/ Centre</b>	<b>Connection speed/Cost</b>	<b>Status</b>
<b>Guyana (2002)</b> Population 0.8 million GDP/cap (US\$ppp)= 3640 Literacy rate= 98.4 HDI rank 93 (index= .704)	33	3 computers per centre	One VSAT serving 4 – 5 connect points, one of which is a tele-center. Cost to tele-center: <b>US\$ 170/month</b> (set to be equal to cost of connectivity system operation)	IADB pipeline project (2002).
<b>Jamaica (2002)</b> Population 2.6 million GDP/cap (US\$ppp)= 3561 Literacy rate= 86.4 HDI rank 78 (index= .738)	60	5 computers per centre	Dial up service using existing service providers at estimated cost of <b>US\$ 166/month</b>	2002 data. Project approved, presently preparing tender docs.
<b>Peru – Sept. 2003</b> Population 25.2 million GDP/cap (US\$ppp)= 4622 Literacy rate= 89.6 HDI rank 73 (index= .743)	818	Minimum of one computer per centre.	Minimum speed of <b>64 Kbps</b> per tele-center.  (Commercial rate of dedicated line to urban tele-center in November 2000: <b>US\$ 476/month</b> )	This is second consultation round (late 2003). Still under review.
<b>Sri Lanka</b> Population 18.7 million GDP/cap (US\$ppp)= 3279 Literacy rate= 91.4 HDI rank 81 (index= .735)	200	4 computers per centre	<b>This variable is critical to tender design.</b>	

**Sources:**

Data on population, GDP/cap, adult literacy, and Human Development Index (HDI) are for 2001 as reported in UNDP 2003. Tele-center country data are from original tender and project documents.

Two features of the Latin America and Caribbean experience stand out.

First, connectivity specifications are modest – commensurate with the low productivity setting and limited ability of rural populations to afford very high speed broadband. The largest and most recent reverse auction is presently establishing 3,200 tele-centers in Brazil. That tender was won by Gilat, a VSAT operator, and the speed of connectivity delivered at the tele-center is considered “broadband” at 256 Kbps.

Second, although the reverse auction have been technology neutral, satellite technology, VSAT in particular, has repeatedly won the contests.

## **Tender Design**

The design of a reverse auction tender may in principle be technology neutral, but in practice the way that a contest is designed may stack the odds in favor of one technology or another. This is especially true in thin markets involving only a few bidders.

Wireless satellite solutions have repeatedly won Latin American contests because they can serve remote sparsely populated communities at a low cost. Cable modem can provide cost-effective service in residential urban areas, but is an expensive option for small rural towns. Cable modem and apartment LANs have made it easier to introduce facilities based competition in Korea. Nevertheless, the Korean government uses satellite technology to serve sparsely populated areas (Lee [2002], p. 6.).

The recommendations for Sri Lanka’s reverse auction tender follow.

- R21** Seize the opportunity to increase facilities based competition in the country. Avoid a lock-in to telecommunication technologies that could give a commanding advantage to the dominant operator.
- R22** Help spur demand by designing the tender combining connectivity to VGKs with connectivity to government offices (Post Office, hospitals, police stations, libraries, secondary schools) in the small towns to be served.
- R23** Network specifications should be written in a way that is consistent with demand requirements of low income, rural communities that have very little experience and few opportunities to make effective use of high speed broadband. Care should be taken not to spend more than is necessary, and to avoid developing a backbone that will not be fully utilized for a long time yet.
- R24** A suitable license and a competitively priced interconnection agreement may need to be part of the tender offer, in order to enable the winning bidder to complete local and international calls in Sri Lanka at an affordable price.

## **Increasing Depth of Outreach**

The scope of outreach of the Tele-center Program will be significant, but depth of outreach will be limited.

The program will focus on larger towns, mostly forsaking service to *Purana* or Ancient villages which represent about one fifth of Sri Lanka’s 38,000 villages, and where pockets of severe poverty are found. A common feature of *Purana* villages is their remoteness and isolation, which limits access to transport, education and health care services. These groups cannot be easily serve at an affordable cost. A basic level of service could be

achieved if tele-centers were allowed to broadcast services or establish wireless connections to these remote areas, but present legislation does not allow it.

**R25** A review of legislation that presently impedes the establishment of local *WiFi* networks and broadcasting from the VGKs may also be beneficial.

Another group that will be difficult to reach are those affected by Sri Lanka's civil war:

displaced families, numbering an estimated 380,000 people at end of 2003 (Norwegian Refugee Council [2004]);

people in the North and Eastern provinces, beginning the process of reconstructing their lives in a difficult setting affected by years of destruction and abandoned infrastructure.

A third group needing special assistance are the chronic poor (Tudawe [2001] pages 20-26); people who fall through the cracks. Included are the urban poor, especially destitute and indigent people, and unemployed youths; female headed households; older people; and street children and working children.

The tele-center program cannot of course be expected to resolve every poverty problem in the country. Nevertheless, grant assistance should reward NGOs that are willing to work innovatively using ICTs effectively in support of these groups in special need.

**R26** The e-Society fund will enable NGOs and grass root groups undertake community initiatives using VGK services. Program design should be articulated with other programs, especially the Community Development and Livelihood Improvement *Gemi Diriya* Project. (World Bank [2004]).

### **Coordination with Multiple Stakeholders**

Many of the critical choices and challenges that will determine VGK impact and sustainability, will have to be addressed in partnership and coordination with a variety of government ministries and agencies and with civil society.

Realizing the proposed e-Government choices (**R1** through **R8**) need coordination with a variety of institutions (Ministries of Education, Agriculture, and Labour, Institute of Surveying and Mapping, University of Colombo, Sri Lanka Business Development Centre, and others)

The development of interoperable e-Government standards (**R11**) requires policy decisions to be made within an inter-agency framework of cooperation, in consultation with civil society stakeholders.

Work on Sinhala fonts (**R12**) has engaged several government agencies. Future work on low cost software solutions (**R13** through **R16**) will be carried out in coordination with the country's open source community (e.g. Lanka Software Foundation, Linux User Group and University of Colombo School of Computing).

To ensure that the proposed local arrangements for the use of the VGKs during morning hours (**R17**) are compatible with Ministry policy and plans for teacher training and ICT use in schools, coordination with Ministry of Education officials in Colombo is indispensable.

In order to enhance the impact of computer literacy training (**R18**), practice voucher schemes (**R19**) and tele-center operator training (**R20**), good coordination with other agencies and stakeholders is required: e.g. Ministry of Education, local government officials, distance e-Learning center managers in Jaffna University, South Eastern University, Education College in Hatton, and Chamber of Commerce.

The design of the connectivity infrastructure reverse auction (**R21** through **R24**) will be done in collaboration with the Telecommunications Regulatory Commission of Sri Lanka (TRC).

State sponsored duplicate or separate infrastructure developments should be not be embarked upon; e.g. to provide connectivity to other institutions such as Post Offices, health facilities, local government offices. To determine common connectivity points to be shared with the VGKs, and to establish interagency agreements that will enable government to defray the costs of the infrastructure developed (**R22**), inter-agency coordination is indispensable.

To enable *WiFi* and broadcasting from VGKs (**R25**), coordination with the TRC and the adoption of legislation will be required.

The effectiveness of the e-Society voucher program will require considerable involvement of civil society stakeholders and coordination with other programs that also target NGOs and grass roots organizations (**R26**).

Interagency cooperation is difficult to achieve in practice. It requires **leadership**, a suitable **governance structure**, and, often times, the introduction of **changes in institutional incentives**.

Appreciation for the importance of an integrated approach in ICT development has been, from the start, a signal feature of the e-Sri Lanka initiative. ICTA is a remarkable agency. It is well staffed and well managed, and within the short period it has been in existence it has developed a clear mission and vision for the future, it has negotiated successfully a complex but worthy undertaking, and has developed amongst its staff a culture of effective, transparent and responsible service. Task forces / Focus Groups have been formed to involve a broad spectrum of the population in key planning and programming decisions. ICTA's mandate and governance structure seem appropriate, and there is every indication that the agency enjoys full support at the highest government levels. These are all key ingredients to harnessing good will from other agencies and achieving successful inter-agency coordination.

The recommendations that follow are not a recipe for assured success. They suggest a number of ways to align institutional incentives in a way that facilitate and encourage inter-agency and multi-stakeholder coordination.

#### *Coordination Regarding Choices*

Recommendations **R1** through **R8** are possible initiatives that the Sri Lankan government departments may choose to make. There are probably other good choices that have not been considered here, and not all government offices will be in a position to work at the same pace or at the same level of effectiveness.

Experience in the US shows that a seed fund to give extrabudgetary support to e-government initiatives can provide a good stimulus to innovative e-government services.



Such a fund has proven useful in Virginia and New York, two states with successful e-government programs [Anderson *et. al.* 2003].

A similar scheme could be used in Sri Lanka to support innovative e-government modules that have a potentially high poverty reduction impact. A step-wise modular approach would be followed to mitigate risks.<sup>28</sup> If proven worthwhile in practice, these modules could be subsequently expanded under ordinary budgetary allocations. The proposed seed funding of e-government services would also facilitate coordination and compliance with interoperability requirements (**R11**).

**R27** It is recommended that the e-Sri Lanka program encourage public agencies that are ready to deliver government online services with a potentially **high poverty reduction impact**. To avoid capture of funding on a basis other than merit, a special Board with strong representation from civil society organizations should be established to select proposals on a competitive basis.

#### *Coordination Regarding Challenges*

Addressing the challenges requiring multi stakeholder coordination make necessary the formation of ad hoc stakeholder committees or Task Forces – at both high policy and technical levels - to sort out plans, resources and implementation modalities. Some of this work has already started, mainly through Task Forces / Working groups for the e-Society and VGK programs.

Two additional mechanisms can make the work of these Task Forces / Working groups more effective.

First, make full use of online public consultation. Online consultation of new plans and activities can help keep other stakeholders informed and appraised of opportunities and needs for collaboration. It can help engage the citizenry, increase awareness and change public sector staff incentives in support of increased coordination.

**R28** It is recommended that online consultation be required before major laws are adopted or significant ICT initiatives get under way.

Second, use the e-Society conference to review progress of e-Sri Lanka and the VGK program.

On August 11-15 the first e-Society conference was held, and it is expected to become a regular event. It was an important occasion, in part because it was a joint initiative of the ICTA and the Ministry of Education, and also because it helped raise awareness of children and the citizenry at large of the importance of ICTs for the country's social and economic development. The practical value of the conference could be increased further, if the occasion is used in the future to review progress of e-Sri Lanka and the VGKs.

**R29** One possibility is for a comprehensive independent evaluation to be undertaken in preparation for the conference. The evaluators would be asked to review achievements, identify problems and suggest possible measures to improve implementation.

The results of the review would be first presented to the ICTA and then to other stakeholders for discussion, and subsequently subjected to open public scrutiny online and during the e-society conference.



## CONCLUDING REMARKS

"... harnessing the power of IT is not always easy. The tasks involved are very complex and fraught with risk. Government has already successfully implemented a range of complex projects. However, we still need to improve performance and avoid the mistakes of the past."

Ian McCartney MP, Minister of State, Cabinet Office [2000]

Success in ICT development is far from assured. Firm level data shows considerable variation in the returns on investments in ICTs; some firms do well, but many do not {Dedrick, Gurbaxani and Kraemer [2002]}. There is also a substantial body of evidence documenting Government failures on IT investments.<sup>29</sup>

The more important increases in productivity arising from investments in ICTs come about because of parallel investments in organizational and procedural changes. These parallel investments most often require substantial changes in work flows and take a long time to bear fruit (Brynjolfsson and Hitt [2003]).

e-Sri Lanka and its VGK initiative may be remembered in the future as a turning point for the better in the country's economic and social history, or as another failed government initiative. Achieving success will require a comprehensive vision: one that underscores the promises, which are plentiful, but that also acknowledges the critical choices that need to be made and the potential pitfalls to overcome.

It is in the spirit of contributing to such a comprehensive vision that this document has been prepared. Like any operational document, it is work in progress. It will need to be periodically revised and updated, to acknowledge new opportunities and choices, and to confront new challenges as they arise.

## NOTES

<sup>1</sup> Sri Lanka grew at 3.6% per year between 1990 and 2001 [UNDP 2003], but looks upon Asia's high performing economies for benchmarks. "In the 1960's, Sri Lanka's income per capita was comparable to that of Malaysia, the Republic of Korea, and Thailand, and prospects for balanced growth and development were brighter." World Bank [2002], page 1.

<sup>2</sup> The Economist Intelligence Unit [ 2003], page 17, estimates that between 1998 and 2000 fixed telephone lines grew by 70%, mobile phone users by 400% , and Internet users by 269%.

<sup>3</sup> Four VGK centers established at the end of 2003 in urban centers outside Colombo (i.e. in Jaffna, Embilipitiya, Nuwara Eliya and Kurunagala) as well as four distance/e-learning facilities that the Government of Sri Lanka will pilot: in two universities (i.e. Jaffna University and South Eastern University, Oluvil campus), in the National Education College in Hatton and at the Chamber of Commerce of Matara. Some video facilities at the SIHRN Secretariat in Killinochchi will also be added to form part of this pilot network. Distance education/e-Learning activities for the pilot network will be managed by the organizations selected to execute the sub-program.

<sup>4</sup> □ Both impact and sustainability are important; but they tug in different directions. Within a reasonable institutionally viable range, greater impact generally requires additional expenditure. For impact to be lasting, however, a balance between expenditure and revenues is required.

<sup>5</sup> A good example is the extensive network of *cabinas publicas* in Lima, which reportedly number over 2,000, and where one hour of Internet is priced as low as US\$ 0.50/hour.

<sup>6</sup> □ The term e-Government is used interchangeably with the provision of government services online. Sometimes the term is used more broadly to include any government activity that furthers ICT development.

<sup>7</sup> □ The state of NGOs in Sri Lanka and their relationship with Government is reviewed in [Fernando 2003].

<sup>8</sup> Table 11 refers to agricultural households; i.e. those "who are engaged in crop cultivation, livestock raising and/or casual agricultural wage employment." Agricultural households represent about 45% of all rural households. Wages (agricultural and non-agricultural) and non-farm income accounts for 62% of all income of Sri Lanka's rural households.

<sup>9</sup> □ See also Gamage [2003].

<sup>10</sup> A good working model is the Chilean technical assistance service website – [www.redsercotec.org](http://www.redsercotec.org), through which registered entrepreneurs submit specific queries online to more than 80 specialists on 40 different topics and get a response within 48 hours. For each advice category, the site gives the user a choice of several specialists, providing for each of them his or her picture, location, summary curriculum vitae, and a record of the responses that the specialist has already given to date. Since inception on March 2002, over 5,000 queries have been answered and recorded and have been read online by 100,000 users. Over 20 private and public institutions have partnered with Sercotec to support the service. Queries related to agriculture may, for instance, be addressed to the National Institute of Agricultural Development; legal queries are directed to upper class students of the University of Chile's Law School; and so on.

<sup>11</sup> A brief description is available at: [www.icta.lk/insidepages/Projects/SME\\_Portal.asp](http://www.icta.lk/insidepages/Projects/SME_Portal.asp).

<sup>12</sup> □ Tamil hindus represent 18% of Sri Lanka's population, of which 12% of which are Jaffna-based or Sri Lankan Tamils, concentrated in the North and the Eastern provinces, and another 6% are up-country or estate Tamils brought by the British from southern India and concentrated in the estate plantation areas of the country. Tamil speaking Muslims account for another 7 percent of the population and are engaged mainly and trading and found in the Eastern province (Timberman

and Bevis [2001], p. 1).

<sup>13</sup> Language is a contentious issue in Sri Lanka. Legislation enacted in 1956 made Sinhala the country's only official language and abolished English as a compulsory subject matter. The law sought to redress an imbalance perceived by the Sinhala Buddhist majority in the influence exerted by English speaking Tamils. The effect of the law was substantial: the proportion of Tamils working for the state fell from 60 to 10 percent in the professions, from 50 to 5 percent in clerical service and from 40 to 1 percent in the military. Similarly, a quota system introduced in university admissions reduced university places of Tamils in scientific disciplines from 35% in 1970 to 19% in 1975. Only in 1978 was Tamil recognized as a national language, and only in 1987 was it made an official language. (Timmerman and Bevis [2001], p. 7).

<sup>14</sup>

□ For a comprehensive review of Open Source software use and system attributes, see Wheeler [2004].

<sup>15</sup>

□ The BDS is one example of many. A useful source on licenses is the State of Massachusetts Legal tool kit and Quick Reference Chart ([www.mass.gov/itd/legal/index.htm](http://www.mass.gov/itd/legal/index.htm)).

<sup>16</sup>

□ Open source code sharing online is common. See, for example, UNESCO's Free Software Portal ([http://www.unesco.org/cgi-bin/webworld/portal\\_freesoftware/cgi/page.cgi?g=software/index.shtml&d=1](http://www.unesco.org/cgi-bin/webworld/portal_freesoftware/cgi/page.cgi?g=software/index.shtml&d=1)), and the Open Source Content Management Systems website (<http://opensourcecms.com/>).

<sup>17</sup> The city of Munich has put its plans to migrate to open source on hold, pending a review of potential liability due to patent infringement risks mostly related to Linux [Wildstrom 2004]. The patent infringement risks associated with Linux are discussed in OSRM [2004], Moglen [2003].

<sup>18</sup>

□ Dravis [2003] and [2004], documents successful uses of open source by large private and public organizations. See also Dedrick and West [2004].

<sup>19</sup>

□ "The key decisions of this policy are as follows:

- UK Government will consider OSS solutions alongside proprietary ones in IT procurements. Contracts will be awarded on a value for money basis.
- UK Government will only use products for interoperability that support open standards and specifications in all future IT developments.
- UK Government will seek to avoid lock-in to proprietary IT products and services.
- UK Government will consider obtaining full rights to bespoke software code or customisations of COTS (Commercial Off The Shelf) software it procures wherever this achieves best value for money.
- UK Government will explore further the possibilities of using OSS as the default exploitation route for Government funded R&D software."

Cabinet Office [2002], page 3.

<sup>20</sup> "Many proprietary products are intentionally opposed to interoperability. Interoperability promotes customer independence and choice among vendors" (Rosenberg [2002]).

<sup>21</sup>

□ According to The Economist [2003], Open Office is being translated into an additional 44 languages. The list of native language projects shown in the Open Office website ([www.openoffice.org](http://www.openoffice.org)) does not include Sinhala. However, according to Wijayawardhana and Weerasinghe [2004], the Lanka Linux User Group ([www.lug.lk](http://www.lug.lk)) is working on localization of Open Office.

<sup>22</sup>

□ A small group of professionals are promoting the use of Open Source software in Sri Lanka. The Lanka Linux User Group ([www.lug.lk](http://www.lug.lk)) has been active promoting the Linux platform since 1998. The Lanka Software Foundation ([www.opensource.lk](http://www.opensource.lk)), officially inaugurated in January 2004, is

working on several open source projects. Since March 2004, the Foundation is a partner in the PAN LOCALIZATION Project sponsored by IDRC ([www.panl10n.net](http://www.panl10n.net)). The Project will produce digital dictionaries and grammar checkers for Sinhala, in the Microsoft platform. The Foundation also plans to produce these products in open source. (Wijayawardhana [2004], Ratnayake [2004] and Weerawarana [2004].

<sup>23</sup> A Tamil version of the OpenOffice desktop applications is already available.

<sup>24</sup>

□ A partnership with Bellanet, the developer and manager of Dgroups. Should be considered. e-Sri Lanka would profit from the extensive experience of Dgroups. In turn, the international donor community would benefit from the e-Sri Lanka's contribution to the development of an Open Source portal with added capabilities. Future versions of the software would be supported and maintained by Bellanet. Bellanet would make the software and any future versions freely available for use by the international community, with due credit given to e-Sri Lanka for its contribution.

<sup>25</sup> The authors are obliged to Malathy Knight-John for an update of Sri Lanka's telecommunications sector.

<sup>26</sup>

□ The World Economic Forum's subindex of quality of public institutions attempts to measure respect for private property and "corruption". The latest figures available are for 2002, when Sri Lanka ranked number 59, out of 102 countries considered. Asian countries faring better include: Taiwan (ranked 6), Singapore (7), Japan (16), Korea (25), Thailand (37), China (38), and India (54).

The World Bank's governance data gives six separate components of governance. Roughly, the percentage indicators give the relative position of Sri Lanka, with respect to the total number of countries in the data set. (199). Sri Lanka compares favorably with South Asian countries taken jointly or with middle low income countries; except with respect to political stability. Also note that the country's relative percentage ranking was lower in 2002 relative to 1996 with respect to two indicators: Regulatory Quality and Rule of Law.

**Percentile Rank for Six Governance Indicators Sri Lanka South Asia  
2002 Middle Low Income Countries**

<b>2002</b>	<b>1996</b>	<b>2002</b>	<b>Voice and Accountability</b>	45.0	48.0	29.6	43.1	<b>Political Stability</b>	6.7	20.5	32.4	44.1	<b>2</b>	<b>Government Effectiveness</b>	46.9	59.8	48.1	41.5	<b>Regulatory Quality</b>	66.3	58.8	35.3	40.5	<b>Rule of Law</b>	66.3	60.8	42.1	40.0	<b>Control of Corruption</b>	50.0	54.6	41.5	39.9
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For details, see Kaufmann, Kraay, and Mastruzzi [2003] For a precise interpretation of the parameters given consult: [www.worldbank.org/wbi/governance/](http://www.worldbank.org/wbi/governance/)

<sup>27</sup> I am grateful to Taylor Reynolds and Jin-Kyu Jeong, both with ITU, for insightful comments and documentation on the Korean experience.

<sup>28</sup>

□ The importance of following a step-wise modular approach, as opposed to embarking on major large scale ICT investments all at once, is a recurrent recommendation for mitigating risks (e.g. Rand [2003], Heeks [2002], and [Cabinet Office 2000]).

<sup>29</sup>

□ Most of the information available is for industrialised countries. Heeks [2002] gives references and concludes that "...very roughly, something like one-fifth to one-quarter of industrialised country IS [information systems] projects fall into the 'total failure' category, something like one-third to three-fifths fall into the 'partial failure' category, and the remaining minority fall into the 'success' category.

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