

Public Disclosure Authorized

Public Disclosure Authorized

Public Disclosure Authorized

Public Disclosure Authorized



Information and Communication Technologies for Rural Development Issues and Options



REPORT NO. 33503-ID

REPUBLIC OF INDONESIA

**Information and Communication Technologies for
Rural Development:
Issues and Options**

October 2005



The World Bank

East Asia and Pacific Region
Rural Development and Natural Resources Sector

CURRENCY EQUIVALENT

(Exchange Rate Effective 30 September, 2005)

Currency Unit = Indonesian Rupiah (IDR)

IDR 9300 = US\$1.00

Abbreviations and Acronyms

ADSL	Asymmetric Digital Subscriber Line
APJII	Indonesian Internet Service Providers Association
BAPPENAS	National Development Planning Agency
CAII	Citizen Access Infrastructure Initiative
CIDA	Canadian International Development Agency
CIC	Community Information Center
CICC	Community Information and Communication Center
CTLC	Community Technology Learning Center
DAFEP	Decentralized Agricultural and Forestry Extension Project
DLL	Digital Leased Line
FEATI	Farmer Empowerment through Agricultural Technology and Information
GDLN	Global Distance Learning Network
GNI	Gross National Product
ICT	Information and Communication Technology
IDRC	International Development Research Center, Canada
IIDP	Information Infrastructure Development Program
IIX	Indonesian Internet Exchange
INKOWAN	National Women's cooperative
IPTEKNet	Science and Technology Information Network
ISP	Internet Service Provider
IT	Information technology
ITU	International Telecommunication Union
KIPP	Office of Information on Agriculture and Forestry Extension
KUB	Community Business Group
KUD	Village Cooperative Unit
LAN	Local area network
LIPI	Indonesian Institute of Science
LL	Leased Line
MASTEL	Masyarakat Telematika Indonesia (The Indonesian Infocom Society)
Mbps	Mega-bits per second (bandwidth)
MCT	Multi-purpose Community Telecenter
MDG	Millennium Development Goals

MNRT	Ministry of Research & Technology
MOH	Ministry of Health
MOHA	Ministry of Home Affairs
MONE	Ministry of National Education
NGO	Non-Government Organization
NITF	National Information Technology Framework
PCO	Public Call Office
PDII-LIPI	Center for Scientific Documentation and Information, Indonesian Institute of Sciences
PUSKOWAN	Provincial Women's Cooperative
PUSTEKKOM	Pusat Teknologi Komunikasi dan Informasi Pendidikan (Center for ICT for Education)
RISTEK	Research and Technology Institute
RTID	Rural Telecommunication Infrastructure Development
SLTP	Junior High School
SME	Small & Medium Enterprises (Small & Micro Enterprises)
SPPQT	Federation of Farmers Associations
S&T	Science and Technology
TKTI	Indonesian Telematics Coordinating Taskforce
TSN	Telecenter Support Network
UNDP	United Nations Development Program
UNESCO	United Nations Educational, Scientific and Cultural Organization
USAID	United States Agency for International Development
VOCM	Voice of Concerned Mothers
VoIP	Voice over IP – Internet telephony
VSAT	Very Short Aperture Terminal
WAN	Wide Area Network
WARNET	Warung Internet (Internet Kiosk)
WARTEL	Warung Telekomunikasi (Telecom kiosk)
WiFi	Wireless Fidelity (Wireless LAN based on 802.11 protocol)
WSIS	World summit on Information Society

Vice-President:	Jemal-ud-din Kassum
Country Director:	Andrew D. Steer
Sector Director:	Mark D. Wilson
Task Team Leader:	Shobha Shetty

ACKNOWLEDGMENTS

This report is the work of the World Bank's Rural Development and Natural Resources Sector Unit of the East Asia and Pacific Region. The core team responsible for the preparation of this report was led by Shobha Shetty (Sr. Economist, EASRD) and comprised Francisco Proenza (Economist, FAO Investment Centre), Robert Schware (Lead Informatics Specialist, CITPO), Wati Hermawati (Gender and ICT Consultant), Sonia Jorge (Gender and ICT Consultant), and Chat Garcia Ramilo (Gender and ICT Consultant).

This report is based on field visits, interviews with local and central government and non-government organizations and desk reviews carried out between December 2004-April 2005. The team would like to express its sincere thanks to the staff of the Ministry of Communication and Information, Ministry of Agriculture, Ministry of Research and Technology, Ministry of Women's Empowerment, Ministry of Social Welfare, Directorate General of Posts and Telecommunications, Ministry of National Education, Ministry of Cooperatives and Small and Medium Enterprises, BAPPENAS, Ministry of Home Affairs, and the National Agency for Meteorology and Geophysics (BMG). The team would also like to thank the Association of Community Warnets (APWKomitel), Koalisi Perempuan, Indonesian Informatics Society (MASTEL), Chamber of Commerce (KADIN), Regional Women's Cooperative (PUSKOWANJATI), Indonesian Information Technology Federation (FTII), and Suara Ibu Peduli for their helpful collaboration.

The report was prepared under the guidance of Rahul Raturi, Sector Manager, Rural Development and Natural Resources, EASRD. Peer reviewers were Eija Pehu (ARD), Charles Kenny (CITST), and Idris Suleiman (FTII). Helpful comments were also provided by Stephen Mink (EASRD), Migara Jayawardena (EASUR), Magdi Amin (EASFP), Natasha Beschorner (GICT), Petra Karetji (EASES on behalf of SOFEI/Eastern Indonesia Team, Makassar), Chitra Buchori (EASES), Jankiram Subramaniam (ARD), and Alex Robinson (University of Huddersfield). Dewi Sutisna (EACIF) provided valuable administrative assistance. The report also benefited from the comments and discussions during a national rural ICT workshop held in Jakarta on June 6-7, 2005.

Financial support from the Norwegian / Dutch Trust Fund for Gender Mainstreaming in the World Bank (GENFUND) and the International Development Research Center (IDRC), Canada is gratefully acknowledged.

TABLE OF CONTENTS

	Page No.
Executive Summary	i
I. Introduction	2
II. Infrastructure and Regulatory Issues	7
III. ICTs at the Service of the Rural Poor	22
IV. Community Access Centers – Learning from Experience	57
V. Bridging the Gender Divide	66
VI. The Way Forward	94
 <u>Tables</u>	
Table 1.1 Fixed and Mobile Telephony in selected Asian countries	3
Table 1.2 Public Governance Indicators – Selected Asian Countries, 2004	6
Table 2.1 Status of the Internet and Broadband services	8
Table 2.2 Villages without Telecommunications Access in the Six Largest Provinces	9
Table 2.3 Telecommunication Revenue and Investment	10
Table 2.4 Examples of minimum subsidy auction process for public rural telephones	17
Table 3.1 Incidence of Poverty in Indonesia, by Rural-Urban Area and by Region	22
Table 3.2 Uses of the Internet by Sample of Users of 15 Yogyakarta Warnets	24
Table 3.3 Characteristics of Sample Warnet Users in Yogyakarta	25
Table 3.4 Use of the Internet by Lima’s Regular Internet Users Aged 8-70: Habitual Place and Places of use by Socioeconomic Status - 2004	26
Table 3.5 Peruvian User Perception of Favorable and Unfavorable Attributes of <i>Cabinas</i>	27
Table 3.6 Principal Rankings by Yogyakarta Warnet Users of Possible Factors Limiting their use of the Internet	27
Table 3.7 % of Perú’s <i>Cabina</i> Users who Talk on the Phone through the Internet, by Socioeconomic Status	28
Table 3.8 Key Determinants of Tele-center Profits, Effect of Urbanization and Project Target Variables	30
Table 3.9 Rate List for Chiraag Kiosk Services (n-Logue, Madras)	31
Table 3.10 Stylized Comparison of Private vs Public Sector Telecenter Approaches	33
Table 3.11 e-Government and Human Capital Indicators: Asia and Selected Countries	35
Table 3.12 Products Referenced more than 20 times in Market Postings to Ministry of Agriculture Market Online Service	39
Table 3.13 Starting a Business in East Asia and the Pacific, 2004	48
Table 3.14 Potential Impact on Rural Poverty, Sustainability and Governance, and Institutional Feasibility and Risk of Principal Recommendations	56
Table 5.1 Comparative Access to Connectivity and Information in Six Study Sites	71

Table 5.2	Total number of schools that have received support through the OSOL program (as of February 2005)	76
-----------	---	----

Boxes

Box 1.1	Selected International Examples of Rural ICT Innovations	3
Box 2.1	Telecommunications – Aceh and North Sumatera	13
Box 2.2	VSAT IP Solution for Warnets/Wartels	14
Box 2.3	Local Government in East Java: Halts New Drilling Operations	15
Box 2.4	The Potential of Public Private Partnerships (PPP) to Provide Rural ICT Access	16
Box 2.5	Air Putih in Aceh - A Cautionary Tale	16
Box 2.6	Examples of World Bank Projects with an OBA Component	19
Box 3.1	n-Logue Communications (www.n-logue.com)	42
Box 3.2	Salatiga Alternative School	52
Box 4.1	Indonesian initiatives to establish public access centers	58
Box 4.2	Warintek Operations	60
Box 4.3	E-Pabelan Community Telecenter	62
Box 5.1	KIPP Kabupaten Magelang, Central Java	74
Box 5.2	ICT for education in African countries	76
Box 5.3	Community Learning and Training Center	78
Box 5.4	Puskowanjati, the Central Women’s Cooperative in East Java	80
Box 5.5	Women’s socialization to ICTs	82
Box 5.6	Community Telecenters - Beyond Access	85
Box 5.7	Fiji Suitcase Radio	86
Box 5.8	Rural Community Radio Initiatives in Indonesia	87
Box 5.9	Self Employed Women’s Association (SEWA), India	89
Box 5.10	Cooperative Networks in Poland	90
Box 5.11	Gender mainstreaming in Korea’s efforts towards an information society	93

Figures

Figure 1	Telecenter Profit = f (Urbanization, x1, x2, x3, ..., xn)	29
Figure 2	Ministry of Agriculture Market Data: Number of Offers to Buy or Sell in Jan-Nov 2004	38

Annexes

Annex 1	Status of Fixed and Mobile Telephony	98
Annex 2	Tax Revenues for Funding Universal Service	99
Annex 3	Survey of Users of 15 Warnets in Yogyakarta	101
Annex 4	Perú - Information Services to Increase State Purchases from Small and Microenterprises	115
Annex 5	Chile’s Redsercotec Advice Online Service	117
Annex 6	Email Survey of Users of Ministry of Agriculture Market Online System	127
Annex 7	Digital Literacy Training in Chile by Biblioredes	132
Annex 8	Gender Case Studies	138
Annex 9	References and Bibliography	148
Annex 10	Glossary	155

EXECUTIVE SUMMARY

With recent advances in information and communication technologies (ICTs), the creation and dissemination of information and knowledge have dramatically increased in speed and outreach. The "knowledge revolution" has started to re-shape the global economy through greater competitiveness, new economic growth and job creation, better access to services, and greater empowerment of local communities. In poor isolated rural populations with limited skills and educational resources and difficult physical access, human development is particularly hampered by insufficient access to information and knowledge resources and communication facilities. ICT has been effectively applied in many rural development contexts world-wide. In the form of multimedia rural telecenters, ICTs have served as a nodal point for community connectivity, local capacity building, and serve as hubs for applications such as distance education, telemedicine, agricultural extension, support to SMEs, promotion of electronic commerce, environmental management, and the empowerment of women and youth.

The challenges facing the development of rural ICT in Indonesia are similar to those in other developing countries in the region – private sector neglect of rural areas, poor connectivity, weak rural infrastructure and low human resource capacity. Despite these hurdles, rural ICT initiatives have burgeoned in countries such as Thailand and India over the past five-eight years. The rural internet kiosks function as a communications hub, a virtual academy/training center, support center for rural entrepreneurship, trading outlet, center for financial and insurance services, etc. The projects are having a significant impact on youth, women, and children in indirect ways. With decentralization and the new political and institutional environment in Indonesia, it is possible to envisage ICT for supporting rural development here too by enhancing the capability and effectiveness of local governments, and improving access to public services.

Infrastructure and Regulatory Issues

Access to basic telecommunications services is very poor in Indonesia, particularly in rural areas, and outside Java. Over 150 million Indonesians--75 percent of the population--have yet to benefit from access to basic fixed line, mobile or other electronic communication. Only four percent of Indonesians have access to fixed telephone lines. Mobile access is increasing, but is very limited outside major urban centres. Rural telecommunications access is very limited: 65 percent of all villages¹ outside Java are without access to telecommunications and information services while the Jakarta metropolitan area enjoys about 40 percent teledensity. Less than one percent of the population has access to the Internet, one of the lowest figures for the East Asia and Pacific region.

Table A: Status of the Internet and Broadband services

	Korea	Malaysia	Thailand	China	Indonesia
Teledensity (2003)	70.1	44.2	39.4	21.5	8.7
ISP charge, total US\$ (2003)	3.1	3.7	5.6	7.3	10.7
Internet users per 100 inhabitants (2003)	61.0	34.4	11.1	6.3	3.8

¹ 43,022 villages

Internet subscribers as % of telephone (2002)	46.4	45.0	24.8	23.2	8.3
Broadband as % of total Internet subscribers (2002)	91.47*	0.2	0.1	4.6	2.5

*This figure reached 100% in 2003

Source: ITU

The World Bank's recent *Averting an Infrastructure Crisis: A Framework for Policy and Action* report recognizes that despite significant progress having been made in the telecommunications sector in Indonesia, much remains to be done to “systematically address the inadequate access to telecommunications and information services for the thousands of underserved villages in Indonesia.” Enhancing the delivery of user services to rural areas, including market, weather and agricultural information, distance education, health care, entertainment, and e-governance, are all dependent to a large extent on ICT infrastructure. ICT is therefore the enabling technology that can be used to leverage opportunities for enhancing agricultural and rural development.

The Government of Indonesia recognizes the imbalance in the provision of telecommunications infrastructure and services between urban and rural areas and also the importance of available and affordable access to ICT. Its policy objective is to ensure that every citizen has reasonable and affordable public access to communications services by the year 2015. Sector reforms in recent years have rapidly extended the reach of telecommunications to urban areas. Government and industry associations and corporations have tried to establish multipurpose community telecenters to provide ICT access to rural un-served communities. Ensuring that villages have access to some form of telecommunications service should have a spillover or catalytic effect, introducing the services to the rural population.

There are demonstrated opportunities to deploy appropriate new technologies suitable for unserved or underserved areas such as new low-cost “voice over Internet applications”. And there are successful cases of competitive “output-based aid” (OBA) type minimum subsidy programs being used around the world to allow the market to determine which operators will best provide services to specific high-cost areas that are otherwise uneconomic to serve. Competitive bidding for such subsidies also holds promise for the provision of schemes to increase affordability of bandwidth and to enhance SME development through multipurpose telecenters in rural communities, the development of content, applications, and training. Further good news is that experience across a wide range of developing and industrial countries indicates that people everywhere are willing to spend part of their income on telecommunications services, typically 1-2 percent of GDP in rural areas.²

Improving Rural Livelihoods through ICTs

Agricultural Marketing

Very few farmers have access to telephones, although a small number are beginning to use mobile phones. It is mainly the larger commercial farm enterprises who have access to telephones, computers and the Internet. There are nevertheless some promising efforts, in Indonesia (Sugandi

² Bjorn Wellenius, “Extending Telecommunications beyond the Market: Toward universal service in competitive environments,” World Bank Viewpoint Note No. 206; “Financing Telecommunications Needs in the Developing World: A World Bank contribution to the World Summit on the Information Society Working Group on Financing ICT,” World Bank Global ICT Department, February 2005.

[2005]) and elsewhere (e.g. in Sri Lanka) to increase the transparency and exchange of information on market prices and thus lower trader margins. Price and market information is generally gathered locally by farmers themselves and by research and support staff. This is most often broadcast using private radios (where budgetary constraints allow) or using the national public radio station. An Information System of Processing and Marketing of Agricultural Products (SINGOSARI; in <http://agribisnis.go.id>) to disseminate price information through the web has been developed by the Ministry, and the methods for collecting and posting the data through the system are being developed. The Ministry of Agriculture has also instituted a Market Online service, which appears prominently in its website (<http://agribisnis.deptan.go.id/FORUM/default.asp>). The service enables the posting of offers to buy and sell products.

Agricultural Research and Extension

Given present access limitations - including not only lack of access to the equipment, but also familiarity, skill and comfort in its use - research and extension workers will remain, in the coming years, the main knowledge brokers - purveyors of agriculture related technical knowledge and information. In general, agricultural research staff have access to ICTs. A large majority use mobile or land phones, and in each research/extension center there is a small cadre of researchers familiar with the use of computers and the Internet. Regularity of use of the Internet by Research/Extension staff within the BPTP/AIAT system (Technology Assessment Institutes, Ministry of Agriculture) is constrained by the high costs of connectivity, and depends on local budgetary allocations; e.g. in Magelang's Office of Agriculture and Forestry Information, it is rationed to use by 4 persons and 3-5 hours a week, out of a total of 34 professionals supporting the work of 140 field staff. Access to ICTs by the country's approximately 33,000 extension workers, who are presently dependent on local district governments, is negligible.

Rural Education

The Directorate of Technical and Vocational Education (DTVE) of the Ministry of National Education is executing an important program of 'block grants' to qualifying schools to help fund the establishment of ICT Centers which draw wireless connectivity and help connect neighboring (mainly secondary) schools within a district (Priowirjanto [2005]). An estimated 44 such ICT Centers have already been established. This is noteworthy for two reasons: First, the program relies on local initiative, and involves not only public schools but also qualifying private schools. The Center for ICT Studies in Jakarta (www.ictcenter.net), is part of a private Tourism school. The Center is staffed with a dedicated young cadre of school instructors highly qualified in ICTs who have set up an ISP and are presently serving 17 Warnets within a 30 km radius. Second, contrary to the norm in many countries, Indonesia's public school system allows public schools to establish "productive activities" to produce goods and services for sale to the public. This helps generate income for the school and, in the case of ICTs, could help enhance the prospect of sustainability. An example is the community Warnet in Magelang's school for Technology and Manufacture, with about 20 computers operated alongside its school lab, which charges Rp 1,500/hour. The practice is accepted practice mainly in the Vocational schools, but could in principle be applied by other parts of the public school system.

Present public offer of content online directed at enhancing school curricula is sparse. The DTVE website (www.dikmenjur.net) does provide services of interest to school teachers, including a forum for exchange of news of information which represents an interesting way of promoting teacher proficiency in the use of the technology. The Educational Communication and Information Technology Center (Pusat Teknologi Komunikasi dan Informasi Pendidikan, PUSTEKKOM) of the

Ministry of National Education has a long trajectory in the use of technology to enhance the quality of teaching, and has begun to offer selected content for elementary, junior high and high school students that are downloadable from their site (www.pustekkom.go.id and from <http://www.e-dukasi.net/>). A few teachers are also using the Internet to reinforce their school curriculum (e.g. in Peasant Association school in Salatiga). Further development and dissemination of educational online content in the Indonesian language is important. Computers at home or in the classroom may be distracting and even detrimental to students, unless put to good use through educational material available in the Internet or educational software (Fuchs and Woessmann [2004]).

Micro, Small and Medium (SME) Rural Enterprise Development

Considering that the number of micro, small and medium enterprises (SMEs) using the Internet in 2001 represented less than 1% of the total SME population, (Castle Asia [2002]), the number of rural SMEs presently using the Internet is negligible. The proportion of rural SMEs using mobile telephones is probably higher than those using the Internet, but lower than the proportion of mobile users in Indonesia, i.e. 5.5% in 2003 (ITU 2004).

Information on SME use of the Internet is available only for urban SMEs. The Asia Foundation's study of SMEs and e-commerce [2002] gives examples of highly effective uses of the Internet by SMEs in 12 Indonesian cities and identifies three kinds of SMEs: Internet Users, Prospective Users and Traditional Companies. It finds a strong correlation between Internet use and entrepreneurial capability, including educational level and managerial effectiveness, and concludes that those enterprises least prone to use or uninterested in using the Internet are also those facing critical entrepreneurial shortcomings. SMEs who do connect do so mainly in response to the demands of the market; e.g. buyers who wish to see pictures of their products or who wish to communicate cheaply via email, or SMEs who on their own initiative use the Internet to search for new clients.

Present online service offering to SMEs by Indonesian Government websites is limited. Noteworthy is the Ministry of Trade and Tourism site (www.dprin.go.id/Ind/tec.asp), which contains a registry of enterprises with a brief description of each and contact information. The site also enables the posting of business opportunities. The site of the Small and Medium Enterprises and Cooperatives Development Agency (SMECDA; www.smeccda.com), gives background information about the agency, statistics on SMEs and Cooperatives, a map showing a list of products for each locality and a list of (formally registered) SMEs in each area, and a links to other sites. SMECDA has engaged technical advisors in several regions of the country to provide technical assistance and advice to SMEs. There appear to be no Government efforts in Indonesia to provide advice or business development services using ICTs. This may have been justifiable, up to now, given low levels of use of the Internet by SMEs.

A feasibility study geared to finding ways of using ICTs to contribute to a reduction in informational and transaction requirements associated with doing business in Indonesia is recommended. The principal focus of the study should be on requirements that directly affect informal and rural SMEs.

The introduction in Indonesia of a program similar to the Peruvian State purchases system is recommended. Such a system would reinforce present Government efforts to fight corruption. It would also increase competition for State purchases, increase the demand for goods and services from the formal SME sector and, by stimulating Internet use through a very practical application, help SMEs lower their overall communications and transaction costs and thus strengthen their competitiveness. Actual implementation of the system would not be technically demanding for

participating agencies, but the passage of legislation sanctioning the new system and requiring notification to a centralized agency (e.g. SMECDA) would be indispensable. Collaboration between the Ministry of Agriculture and SMECDA is recommended, to work for the establishment of a single entry.

Community Access Centers – Key to Improving Rural Access

In Indonesia, there have been a number initiatives to establish public access centers or telecenters including the Warinteks of the Ministry of Research and Technology, Warsi Information Kiosks of the Ministry of Industry and Trade for SMEs, Community Electronic Information Network (JIMIE) National Information Agency (LIN), provides government information to commercial Warnets, Community Tele-Service Center (BIM) developed by the Indonesian Information and Communication Society (MASTEL), Community Learning Centers of the Ministry of National Education, the Microsoft-sponsored Community Technology Learning Centers (CTLCs) etc. The definition of so-called telecenters varies considerably. In its simplest form the telecenter is limited to providing public telephone, fax and/or Internet services. In Indonesia, these micro enterprises are called Wartel (*Warung Telepon*) and Warnet (*Warung Internet*), and are run for example on a family telephone connection in a spare room of a house, or in a pair of portable booths by the roadside. There are over 200,000 Wartels and 2500 Warnets⁴ in Indonesia.

It is commonly believed that the rural poor cannot afford to pay for telecenter services. Operating in about 2,400 kiosks in Southern India in an area with an average per capita income of around US\$ 20/month, n-Logue Communications is showing that where services offer **practical value** people are willing to pay for them. Yet another commonly held misperception is that rural people, especially women cannot use such advanced technologies due to illiteracy, and socio-cultural barriers. On the contrary, poor rural women in Bangladesh have had no difficulty using GSM cell phones, despite never before using phones of any type. Poor farmers in El Salvador use telecenters to negotiate the sale of their crops over the internet. And women in the coastal villages of Southern India have in less than a week learned to use PCs to interpret real-time satellite images showing concentrations of schools of fish in the Arabian Sea so they can direct their husbands to the best fishing areas. Clearly, poor communities are ready to adopt new technologies that demonstrably improve their economic opportunities and the quality of their lives (Prahlad and Hammond, 2002).

There are potential models, such as Microsoft's CTLCs which, with some modification, can be scaled up for providing access and training at the village level. Both rightly put significant effort into identifying viable local NGO partners during the program preparation phase, and their focus on computer skills based training provides a clear mission for the centers. Although all of the programs' national sponsors claimed that content provision was a focus of their program, the fact on the ground is that none of the telecenter programs except Warintek are content focused – they are primarily about training, secondarily about access.

All of the programs which operate at the village level are grant funded, and none have firm plans in place for sustainability beyond the end of the grant period (perhaps the most common characteristic

³ These are local non-formal educational institutions, run in partnership with NGOs, local government, women's organizations, and religious groups. There are currently about 1,600 CLCs in Indonesia, but very few if any provide technology services or Internet connections, so they are not really telecenters in the way the term is commonly understood.

⁴ Kretek Internet: Indonesia Case Study, ITU, 2004

of all past and present telecenter projects in Indonesia). Of the programs which operate in rural areas, only Warintek is structured to allow for significant entrepreneurial or private sector involvement (in many cases amounting to little more than a government subsidy to institutionally-based Warnets to purchase extra computers). Of the programs which charge fees for services, training in computer skills (primarily use of Microsoft Office) is most in demand. This was true for all centers except the Warintek, located at a university where a sizable student body created demand for Internet access.

The high cost relative to income of dial up service via in rural areas severely limits Internet access demand. Lack of local language content, high cost relative to income of dial up service in rural areas⁵ and lack of awareness and facilitation in the use of Internet content and services (such as VoIP) are also factors in low Internet access demand.

Gender Considerations

In 2000, a Presidential Instruction on Gender Mainstreaming in National Development was issued by the Indonesian national government that instructed all “departments and non department government agencies, provincial and district governments to implement gender mainstreaming in planning, implementation, monitoring and evaluation of all development policies and programs”. According to the Ministry for Women's Empowerment, the body tasked to oversee the Indonesian government's gender mainstreaming efforts, the country's development approach at that time had not specifically considered development benefits for men and women equally, inadvertently contributing to gender inequality and inequity. In its technical guideline for implementation, the Ministry went on to say that, “gender inequality in various development sectors is indicated by lack of opportunities for women to work and perform business, and their low access to economic resources such as technology, information, market, credit and capital.” An aggravating factor that contributes to this condition of inequality is the lack of participation and involvement of women in decision-making in public policy demonstrated by just 7% representation of women in the top echelons of the national government executive.⁶

According to the Ministry of Communication and Information (MCI)'s E-Strategy Report (2004), many women's groups in rural areas are organized around thrift and assistance provided to them in terms of micro-credit, technology and marketing initiatives. Survey of these groups show that women have been able to earn additional incomes and women's cooperatives have proved to be “model borrowers with a virtually unblemished record of repayments to banks and financing institutions”. The report also makes the point that a number of these women's groups have begun to use computers for maintaining their accounts for acquiring skills in manufacturing superior products or providing services.⁷

Women play pivotal roles in the rural economy of Indonesia. Rural women's labour force participation in the agricultural sector is sixty-one percent (61%), and it is estimated the women carry out 75% of the farm work in rice production.⁸ However, the use of ICTs by women in rural areas is currently very limited due to problems of access and lack of capacity. Experience in other countries

⁵ via *Telkomnet Instan*

⁶ Ministry of Women's Empowerment, “Technical Guideline for Implementation of Presidential Instruction Number 9 Year 2000 on Gender Mainstreaming in National Development, Second Edition, Republic of Indonesia, 2002.

⁷ Ministry of Communications and Information, “Final Report: Indonesia's E-strategy, Jakarta, December, 2004.

⁸ FAO. Fact Sheet Indonesia: Women in Agriculture, Environment and Rural Production.

illustrate that strategies for reaching women in rural areas effectively use multiple forms of media and communication.

Currently, the main sources of information for women are their family and community networks (including community organizations and cooperatives), the community radio (when there is one), television, and printed media (including informational pamphlets distributed by the government's ministries and disseminated by health workers or others). However, these sources are more likely to be simply distribution agents and not producers of information. It is the production of relevant local, regional or national content that needs urgent attention. ICT can facilitate the production of local content and the frequent updating of such content.

There is a lack of awareness and knowledge about the full potential of ICT for development. In fact, most training activities focus on learning software and very little time is devoted to networking skills, advocacy, information and content development, and use of different technologies. There is clearly a need for training in this area, and it is fundamental that trainers be trained to open the possibilities and facilitate strategic use of ICT for development purposes.

There is still a long road ahead before all Indonesians can benefit from the full potential of ICT. That road seems even longer to rural women. Despite some improvements in access and the rapid deployment of lower cost wireless technologies, not much has changed in rural areas of Indonesia. Infrastructure in rural areas is limited and existing services are expensive and practically outside of rural women's reach. Women still face enormous barriers to access communications, and information relevant to their realities is very limited.

There is a great opportunity to ensure that the country's rural ICT policy and programs be properly designed from the initial stages of the process, by integrating gender equality goals and objectives at all levels of development, and indeed, Indonesia could become a model in the region in this regard.

The Way Forward

Clearly, for ICTs to serve rural development needs in Indonesia, major policy reforms need to be undertaken on the **infrastructure and regulatory aspects**. There is considerable international evidence that when there is a powerful incumbent (or a duopoly in the Indonesian case), facilities-based competition and asymmetric regulation are almost indispensable to break up the monopoly power to set prices and control the market. This was certainly Korea's and Chile's experience. It is a thorny issue in the case of Indonesia where the incumbent is 51% owned by the Government. Korea's first step, before promoting facilities-based competition, was to divest itself from its majority stake in the incumbent operator. In Indonesia's case, facilities-based competition will mean establishing VOIP solutions, satellite and wireless technologies but by independent as opposed to the duopoly operators or their subsidiaries. The government will need to rethink its majority stake in the dominant incumbent if it is serious about making a genuine effort to introduce facilities-based competition to bring down connectivity costs and improve rural access. On the regulatory side, empowerment of a truly independent regulatory body particularly for network connectivity and for enforcing interconnectivity arrangements. Transparency and a level playing field are prerequisites to getting more operators in the sector ultimately driving down costs and increasing benefits to the end users.

Given its archipelagic nature, a **fibre/satellite backbone** must be an investment priority for the government if ICT is to be leveraged for economic development. This may well involve use of

alternative fiber optics such as those of the railways, gas lines etc. The recent proposal at the Infrastructure Summit in January 2005 for the “ring of rings” project seeks to establish this backbone through fiber, satellite, and terrestrial wireless but this is only restricted to about 20 islands. The Government can facilitate and indeed stimulate rural access through creating a rural service provider category that works only in rural areas connecting villages with no license fee and no spectrum fee for fixed connections to a village. This could well be subsidized under the USO and could stimulate local SMEs into transforming themselves into such rural service providers. This concept merits further analysis and application.

However, technology alone is not the panacea. Ultimately ICTs are means not ends in and of themselves. In Indonesia, successful examples of ICT applications in rural communities are scarce. Little wonder that rural communities are not convinced how ICTs can help improve their lives. There is a **need for clear demonstrable models of success** for how to make information work for farming communities for instance. For example, when farmer groups were queried as to the usefulness of up-to-date market price information, most indicated that this would be of little use, and preferred access to an “introduction” service to buyers whom they could trust, because without the personal relationship with the buyer, crop prices based on statistical averages were perceived to be of little use. Farmers need to be convinced of the value of information and for agriculture end-to-end services – from inputs, credit, expert advice, loan repayment, transport, marketing – all need to come together in order to provide a bouquet of services that is perceived to be useful by farmers. A partial approach is ineffective at best, and counterproductive at worst contributing to a distrust of ICTs in general.

In the provision of *agricultural marketing* services, given the ongoing rapid expansion of mobile telephones throughout the population, in order to expand the reach of the Singosari system under development, the dissemination of price information through SMS messages sent to registered mobile telephone users is recommended. Further experimentation with the Ministry of Agriculture’s Market Online service is also recommended especially to facilitate the development of specialized markets by product. ICTs make it easy and low-cost to monitor impact and effectiveness. Further experimentation and development with Singosari and the Online Market system, should go hand in hand with user registration and user monitoring and feedback, including periodic surveys of user satisfaction.

For *agricultural research and extension*, several countries have begun to use online means of providing direct answers to farmers and extension workers; e.g. Chile’s Advice Online service (www.redsercotec.cl; Annex C), Sri Lanka’s Cyber Extension Project (www.gov.lk/Agriculture/Agridept/NEWS/News.htm), UAE’s “Ask Advisor” service (www.uae.gov.ae/uaeagricent/AskQ/ask_main_eng.htm), which is using the Chilean system as reference. A system of this nature is particularly suitable for a diverse large archipelago country like Indonesia, and would be consistent with the recent decentralization efforts while reinforcing national integration. Unlike other kinds of e-government services, no major re-engineering of procedures would be necessary; but success will require political determination to institute the system and to encourage staff participation.

In *education*, a comprehensive operational program that covers all aspects of ICT in education should be incorporated into present activities of the Ministry of Education. This program should include the provision of connectivity combined with support for teacher and administrator training, and the development of curriculum and teaching materials. Proper sequencing of activities need to be planned for to ensure full utilization of the available ICT equipment when installed.

The development and dissemination of educational content online deserves support to expand the present offerings aimed at students, teachers and parents. This should be part and parcel of the comprehensive program recommended (R8). It will enhance teacher and student experience and simultaneously encourage school administrators and teachers to get a better grasp of the advantages of using ICTs for educational purposes.

The effort to build viable **community access telecenters** in Indonesia should begin with the establishment of these centers at the Kota/Kabupaten level, and then extend to the village level via a “hub and spoke” structure. This could effectively be accomplished by marrying access center development to the deployment of community owned wireless networks. Dikmenjur’s existing program incorporates both of these functions (as well as community radio) and with private sector management could provide an effective vehicle for delivering both community-wide infrastructure and access services. *Aggregation of demand is the key*, making the community, not the individual – the network customer. *Private sector management* of publicly owned facilities should be a cornerstone of any future telecenter program, to provide the greatest chance of financial sustainability and to encourage a wider user base - beyond members of just one local NGO/organization. At both the district and village level, entrepreneurship should be encouraged. These centers should also ensure access from a **gender perspective** by ensuring that such issues as location, ownership and management (i.e., 50% of owners and/or managers are women, women community organizations, or organizations committed to gender equality), marketing efforts and services are developed to address the specific needs of women in the community. Such services can include capacity building activities and business support services to assist rural women operating micro and small businesses.

Localized content development programs should be undertaken with support from information mobilization specialists, as the ability to determine content needs (as opposed to skills training) is limited at the local level. Due to the high cost, low speed nature of Internet availability at the village level, content development programs should focus primarily on aggregating content which can be provided either on CD-ROM or, for more temporal data, via a scheduled download and then shared over a LAN, to minimize Internet access costs.

Bridging the **gender divide** is all the more important in rural areas because of the significant role that women play in decisions about the allocation of household resources in Indonesia. This is also strongly reinforced by prevailing cultural attitudes concerning the reputation of women for economic acumen, thrift and foresight, and trustworthiness in putting family interests before their own desires. Nonetheless, women also need to be convinced of the merits of ICTs. Experience from India shows that health, livestock and education and most importantly, employment-related information are of key concern to rural women.

Experiences in many countries have indicated that reaching women, particularly in rural areas, in developing countries is facilitated by using **multiple forms of media and communications technologies**. Investment in content development at the local level based on local information needs is also a key to facilitating more women’s access and relevant use of ICTs. The findings of this study revealed that there is a lack of relevant information that supports women’s productive roles in agriculture in the local language. Greater attention should also be paid to recognising women and the poor as information producers, providing relevant training in collecting, packaging and disseminating local knowledge, ensuring that new technologies, such as the computer and Internet, are combined with technologies that reach more women, especially in rural areas, such as radio and print. The provision of relevant local language content, via affordable and easy to use technologies that are

accessible to an audience with few or no reading skills, is crucial if ICTs are to meet the needs of women in rural areas of Indonesia.

Finally, ICT use is subject to **network effects**. If only a few friends and associates use the telephone, telephony is of limited value. It is when the network is large that it makes sense to use the telephone, the computer or the Internet. It is when many family and friends may be contacted through the phone or through email that people find a reason to learn how to use the technology. When it comes to computers and the Internet, attaining access by adults often requires overcoming computer anxiety, a phenomenon which affects adults more often than children. Through market forces alone the use of computers and the Internet will eventually reach a critical mass of micro-entrepreneurs and rural poor, and network effects will accelerate the process making it appealing for the majority of the rural and micro-entrepreneurial population to use the technology. But the process could take several generations.

To reduce the lag time, funding of **digital literacy campaigns** to train select low-income groups has become part of national efforts to further ICT development and are usually incorporated into broader ICT programs. Digital literacy programs stimulate demand, and tend to be self-targeted, as high income people do not generally need ICT training. In Korea, Government carried out mass media informatization campaigns and established Education Information Centers in schools and post offices, used to provide free or low cost information education to an estimated 10 million people, mainly students, government staff, soldiers and housewives. Chile's national digital literacy campaign (Gobierno de Chile [2004]) provides for digital literacy training of 500,000 people for the 2003-2005 period. The program runs in parallel with its telecenter program and includes digital literacy training to users of public library telecenter users as well as specific efforts directed at farmers. A similar program in a country with the relatively high educational achievements such as Indonesia could prove invaluable to dramatically accelerate the use of computers and the internet especially by government officials, micro-entrepreneurs, farmers, women's groups, and grass roots organizations. This will require **political commitment at the highest levels** if it is to succeed.

“It is hardly possible to overrate the value, in the present low state of human improvement, of placing human beings in contact with persons dissimilar to themselves, and with modes of thought and action unlike those with which they are familiar. Such communication has always been, and is peculiarly in the present age, one of the primary sources of progress”.

John Stuart Mill, *Principles of Political Economy*, vol. 3 [1848]

I. Introduction

1. With recent advances in information and communication technologies (ICTs), the creation and dissemination of information and knowledge have dramatically increased in speed and outreach. The "knowledge revolution" has started to re-shape the global economy through greater competitiveness, new economic growth and job creation, better access to services, and greater empowerment of local communities. In poor isolated rural populations with limited skills and educational resources and difficult physical access, human development is particularly hampered by insufficient access to information and knowledge resources and communication facilities. ICT has been effectively applied in many rural development contexts world-wide. In the form of multimedia rural telecenters, ICTs have served as a nodal point for community connectivity, local capacity building, and serve as hubs for applications such as distance education, telemedicine, agricultural extension, support to SMEs, promotion of electronic commerce, environmental management, and the empowerment of women and youth.
2. International experience has demonstrated that information provided in rural telecenters is locale specific and relates to prices of agricultural inputs (such as seeds, fertilizers, pesticides) and outputs (rice, vegetables), market (potential for export), entitlements (the multitude of schemes of the central and provincial governments, banks), health care (availability of doctors and paramedics in nearby hospitals, women's diseases), cattle diseases, transport (road conditions, cancellation of bus trips), weather (appropriate time for sowing, areas of abundant fish catch, wave heights in the sea), etc. The challenges facing the development of rural ICT in India and other countries in the region are the same in Indonesia – private sector neglect of rural areas, poor connectivity, weak rural infrastructure and low human resource capacity. Despite these hurdles, rural ICT initiatives have burgeoned in these countries over the past five-eight years. The rural internet kiosks function as a communications hub, a virtual academy/training center, support center for rural entrepreneurship, trading outlet, center for financial and insurance services, etc. The projects are having a significant impact on youth, women, and children in indirect ways. (Box 1.1)
3. Rural communities need up-to-date information on sources, availability and cost of inputs for production, also on the potential of different techniques and technologies used for production, processing and marketing. However, the information that is often most relevant to improving livelihoods is non-technical, including the role and responsibilities of different institutions in the provision of key services including agricultural extension, credit, health and education, and where to go and who to ask for more specific information. Rural communities increasingly need information about off-farm activities, about rural development projects and policies and how to participate in and influence government processes. It is important that this information is available in an appropriate format and language, and that rural communities have the capacity to analyze and act on it.
4. The Government of Indonesia does not yet have a coherent set of policies and strategies for strategically using ICT as a development tool. This is compounded by the low availability of telecommunication infrastructure in rural areas. Penetration of fixed-line telephones has been low – only around 85 million out of a population of 220 million (or ~4%) have access to fixed-line telephones mainly in urban areas. However, while the teledensity spread between regions is relatively narrow, the spread between urban and rural areas is large. Indonesia's fixed-line teledensity of 4% is the lowest in the region (see Table 1.1). Per capita income does not seem to be a critical factor – neither China nor

the Philippines has a much higher Gross National Income GNI/capita than Indonesia. Vietnam, with about half the GNI/capita still has as high a penetration as Indonesia. However, access figures are likely to be higher.

Box: 1.1: Selected International Examples of Rural ICT Innovations

- In India, ITC, a major private sector agribusiness conglomerate started its *e-choupal initiative* - the single-largest information-technology based intervention by a corporate in central rural India in 2000. By delivering real-time information and customized knowledge to improve farmers' decision-making ability, the e-choupal kiosks helps to align farm output to market demands and aims to secure better quality, productivity, and improved price discovery. Today these kiosks cover 6 states, 25,000 villages and reach 2.5 million farmers. In the next 10 years, ITC hopes to cover 15 states with over 100,000 villages (1/6 of all Indian villages) and benefiting 10 million farmers. The kiosks assist in the supply of high quality farm inputs as well as the sale of agricultural output by the villagers. They now also provide useful information on insurance and commodity dealerships such as motorcycles and tractors. This approach to dealing with farmers has revolutionized agricultural commodity marketing in India through the use of information and communication technologies (ICT).
- In the southern Indian state of Karnataka, the government has computerized 20 million land ownership records belonging to 6.7 million farmers. Each record is available online from 177 public kiosks at an equivalent cost of around Rp 1,700 per record. The records provide valuable proof of land ownership, which farmers need in order to secure credit, and the system is so transparent it has virtually eliminated the corruption of the traditional village accountants. The application will be further developed and included in an expanded service delivery through a program called Rural Digital Services.
- The Philippine government is operating a pilot poverty reduction project consisting of Multipurpose Community Telecenters in rural villages on Mindanao. The project began in 1999, and is democratizing access to information for health, education, agriculture and rural enterprise development, through the shared use of ICT facilities. It has partnered with local non-governmental organizations (NGO) who work closely with the communities to understand their information requirements and to mobilize them towards local development activities that are based on improved access to information. The outcome is expected to lead to nationwide implementation involving potentially 44,000 villages.

Table 1.1: Fixed and Mobile Telephony in selected Asian countries

Country; GNI/capita (\$US)	1995			2003		
	Fixed	Mobile	Total	Fixed	Mobile	Total
China; 1100	3.30	0.29	3.59	20.92	21.4 (50.6)	42.32
Indonesia; 810	1.69	0.11	1.80	3.65	5.52 (60.2)	9.17
Malaysia; 3780	16.57	5.00	21.57	18.16	44.2 (70.9)	62.36
Philippines; 1080	2.05	0.72	2.77	4.17	19.13 (82.1)	23.3
Thailand; 2190	6.06	2.26	8.32	10.55	26.04 (71.3)	36.59
Vietnam; 480	1.05	0.03	1.08	5.41	3.37 (38.4)	8.78

Sources: ITU, World Development Report 2005; figures in parentheses indicate mobile subscribers as % of total telephone subscribers;

5. The Government has recently approved the integration of telecommunications, post, broadcasting management, and information technology policy and coordination into one Ministry (Ministry of Communication and Information, MCI). Three Directorate Generals

(of Posts and Telecommunications, Broadcasting and Information Dissemination, and IT Utilization) will guide implementation of the country's e-Strategy. This updated structure is a first and significant step toward ensuring legal and regulatory mechanisms are in place to make telecommunications and information services available throughout the population. But it can fail in many respects if significant progress is not made in issuing new telecommunications licenses, policies on tariffs, interconnection charges, universal service provision, radio spectrum management, and strengthening the independent regulatory body. The merged institution does not necessarily mean improved rural information access without addressing these sectoral public policy issues, commitment and leadership to override special interest groups, and capabilities to address convergence issues as a result of services that can not be offered across a variety of competing platforms.

6. *Access to the Internet.* In 2002 only some 600,000, i.e. less than 0.3% of the Indonesian population subscribed to the Internet. In August 2003, the total cost of 20 hours of dial-up Internet access per month was about US\$ 22/month, which is prohibitively high. About 50% of this was for ISP and 50% for call charges. This corresponds to almost 38% of the GNI per capita, as compared to an average of 1.7% of GNI/capita in high income countries (ITU, 2003) and hardly affordable for the 52% of the population, who live on less than US\$ 2/day (UNDP-2, 2004). There are over 200 licensed ISPs but only 43 of these are operational. Ten ISPs have nearly 80% of the Internet users market share (Idris, 2004). One reason for the high cost is the high cost of bandwidth. Satellite bandwidth is very expensive – about US\$ 5,000 per Mbps and month. Indonesia is yet to build a national Internet gateway, although an Indonesian Internet Exchange, which connects every ISP, has been established by the Indonesian ISPs. (Akman & Idris, 2003). Access to Internet is also severely limited by the lack of adequate telecom infrastructure in rural areas.
7. The very low level of computer ownership is another reason for the limited number of Internet subscribers. In 2002 the penetration of computers was only 1.2% (ITU, 2003). About 251,000 PCs were used in Indonesian households and 60,000 educational institutions were altogether using only about 58,000 PCs¹. In rural areas it is estimated that there is less than 1 computer per 100 households (Idris, 2004).
8. The number of Internet users is estimated at some 8 million (3.8 % of the population) in 2002, i.e. more than 10 times the number of subscribers (ITU, 2003). That year there were some 3,200 Internet cafés (Warnets) with an estimated total of 640,000 users (Rusdiah, 2004). According to the ITU, the percentage of the population having access to the Internet in 2002 was higher than in India that year (1.6%) but less than in China (4.6 %), let alone Thailand (7.8%), Malaysia (32%), Singapore (50.4%) and Taiwan China (38.1%). However, the number of subscribers and users are currently growing with about 50% annually in Indonesia (Purbo, 2004). Internet cafés (Warnets), and community telecenters (MCTs, CTCs, BIMs) offer the most economical access to communications services in Indonesia as in the rest of the developing world. Still, partly due to the very high cost of bandwidth, commercial Warnets charge about Rps 4,000 (about US\$ 0.45) per hour, or more, and need a relatively large customer base to be financially viable. Many Warnets, which were started in the last decade, have been obliged to close down as the competition has increased. Commercial Warnets are only established in densely populated centers where they are financially viable. Due to the relatively poor quality of the fixed network, dial-up connections are slow and suffer from frequent failures. ISPs also tend to oversell

¹ See www.apdip.net/projects/dig-rev/info/indonesia

their international bandwidth to keep costs down. This results in that access from Warnets, or other customers connected to the ISP by 64 or 128 Kbps, in practice sometimes is also painfully slow.

Rationale for the Study

9. The proposed study is part of a group of activities that the Bank is supporting to improve local service delivery with a view to increasing agricultural and rural productivity. These include a combination of lending and non-lending activities viz., (i) preparation of the Farmer Empowerment through Agricultural Technology and Information (FEATI) project; (ii) Eastern Indonesia Drylands Agriculture study; and (iii) the Rural Investment Climate Survey. In this regard, findings and recommendations from this study are expected to have linkages and impacts on these as well as other rural development activities. The Bank's recent Infrastructure report also recognizes that despite significant progress having been made in the telecommunications sector in Indonesia, much remains to be done to "*systematically address the inadequate access to telecommunications and information services for the thousands of underserved villages in Indonesia.*" Rural development (including revitalizing agriculture) is a key priority of the new government. ICTs are an important instrument which the government needs to be fully informed about in order to leverage opportunities for enhancing agricultural and rural development.

Objective

10. The overall objective of the report is to identify the policies, technologies, institutions and investments needed to improve the access of rural communities to information services in Indonesia. Specifically, the report would illustrate the opportunities that ICT offers policy makers and practitioners in agricultural and rural development and the policies and institutions that would be necessary to achieve social and economic progress on a sustainable basis for the benefit of rural populations with a focus on farming communities and women. For the purposes of the report, ICTs are defined as electronic communication technologies with a focus on the internet and telephony. Radio, multi-media, other communication tools are addressed only to a limited extent.

Methodology

11. The methodology involved a combination of desk reviews, consultations with government agencies, private sector, donors, academics, and selected field visits for the case-studies. In addition, funding was also received from the Canadian International Development Research Centre (IDRC) to carry out an assessment of existing telecenter initiatives in Indonesia which included structured surveys as well as qualitative assessments, results of which are presented here. The report also drew on results from surveys that were carried out in the context of a JSDF Seed Fund in E. Java, S. Sulawesi, and C. Java on rural community information needs. The Department of Informatics, Islamic University of Indonesia, Jogjakarta also provided primary data from a study conducted on *warnets* (internet kiosks) to supplement the analysis of the proposed study. Further, websites especially those pertaining to government agencies and those providing services to rural communities were analyzed. For the gender component, major stakeholders (national government agencies, local governments, civil society organizations, women's organizations, academia, rural women) were actively consulted through a bottom-up process involving public consultations, stakeholder analysis, and focus group discussions to identify the (gender disaggregated) needs of rural communities to ensure sustainable livelihoods. Select field visits were carried out to assess information needs of rural women

to provide practical recommendations to policy makers on mainstreaming gender considerations into strategies for rural information systems. (See Annex for detailed field reports).

Challenges

12. ICTs are a potentially revolutionary means of empowering the poor. Realizing this potential will require investments that increase access to ICTs in remote low productivity areas and the development of innovative applications that cater to the needs of the poor and small firms. The costs of these kinds of investment have been decreasing rapidly, but still yield low short term private returns. The private sector cannot alone be expected to underwrite the costs of these developments. If Government does not support these public investments, economic disparities will rise, undermining social stability and future growth. (Rodríguez [undated])
13. Effective public sector action is required, to establish a regulatory and legal framework that enables the rise of a vibrant innovative competitive private telecommunications and ICT services sector, and to institute selective efficient and transparent public subsidies with high social payoff but low financial returns. This is needed most urgently precisely in developing country contexts where public institutions are often ineffective, corrupt and unaccountable.
14. The challenge takes added significance in Indonesia, a country still recovering from severe economic and political crisis, hardest hit by the biggest natural disaster in recorded human history, undergoing major changes to a decentralized system of governance, and that has very weak public institutions (Table 1.2; Hofman, 2004).

Table 1.2. Public Governance Indicators - Selected Asian Countries, 2004

Country	Public Institutions Index World Economic Forum		Corruptions Perception Index Transparency International	
	Rank	Score	Rank	Score
Bangladesh	104	2.47	145	1.5
China	55	4.39	71	3.4
Hong Kong	9	6.22	16	8.0
India	53	4.45	90	2.8
Indonesia	68	4.12	133	2.0
Korea	41	4.81	47	4.5
Malaysia	38	5.06	39	5.0
Pakistan	102	2.87	129	2.1
Philippines	99	3.21	102	2.6
Singapore	10	6.21	5	9.3
Sri Lanka	72	4.08	67	3.5
Taiwan, China	27	5.56	35	5.6
Thailand	45	4.71	64	3.6
Vietnam	82	3.66	102	2.6

Source: WEF [2004]
Maximum rank: **104**

Source: TI [2004]
Maximum rank: **145**

II. Infrastructure and Regulatory Issues

Infrastructure is central to achieving the goal of digital inclusion, enabling universal, sustainable, ubiquitous and affordable access to ICTs by all. The current lack of adequate telecommunications infrastructure outside the largest cities in Indonesia hinders economic development, creates inefficiencies in governance, and prevents the delivery of much needed educational and health care services available through new technologies. Government of Indonesia, e-Strategy, Final Report, December 2004.

Urban-Rural Gaps in existing ICT Services and Access

15. In spite of the rapid development of the telecommunications industry over recent years, over 75% of the total population of Indonesia or almost 150 million people have yet to benefit from access to basic fixed line, mobile telecommunication, digital and electronic communication. Currently there are 9.1 million fixed telephone lines connecting people across the archipelago--17,508 islands spanning 5,150 kilometers--meaning only four out of every 100 Indonesians have access to fixed telephone lines.

16. Fixed line services appear to be losing their attractiveness to the more lucrative mobile services, whose subscriber rate has multiplied by more than 13 times in the last five years to around 30 million at the end of 2004. However, this is happening mostly in urban areas and therefore both fixed and mobile uptake is still low in the rural areas. Although the growth rates in the uptake of fixed and mobile services in Indonesia are not far from that of other countries in the region, the absolute numbers are considerably lower than China, Malaysia and Thailand (see Annex 1). Mobile telephony offers considerable promise in an archipelagic country like Indonesia and is a classic example of a technology that helps people help themselves in the absence of other infrastructure such as fixed lines, roads, postal systems. As has been noted recently², the prohibitive cost of handsets is the primary obstacle to wider adoption in most developing countries although Motorola has recently won a contract under the auspices of the Global System for Mobile (GSM) Association to supply upto six million handsets for less than \$40 each.

17. Although general access to a telephone and the Internet are considerably higher in Malaysia and Thailand, Indonesia has a higher usage rate of broadband as a percent of total Internet subscribers but it is likely this is a reflection of the concentration of Internet users in Jakarta, where nearly 50% of total ISP subscribers are located. Further investigation is necessary to identify the types of broadband services that may be currently in demand in Indonesia. Broadband capacity is becoming more and more a critical factor for enterprise integration into global and regional markets. Furthermore, trends in OECD countries such as the UK show that broadcasting and media services will increasingly rely on broadband capacity. Today, telecommunications policy and infrastructure need take into account, future and latent demand for more than the basic services.

18. The Republic of Korea has seen the use of the Internet rocket from 1.6% in 1996 to 61% in 2003. Moreover, by 2003 100% of Internet subscribers were using a broadband service. This has been due to:

- rapid deregulation of the telecommunications sector;

² "Calling an end to poverty", The Economist, July 9, 2005. pages 47-48

- competition in the telecommunications market, particularly a concerted effort by the Korean Government to promote facilities-based competition³;
- demand encouragement by Government and operators through extensive informatization campaigns to key target groups (students, government, the military etc.); and
- affordable pricing.

19. There was a sense of eagerness to embrace broadband as a tool to lift the country out of the financial crisis in the late 1990s. The government's ambitious plan to lay optical fiber networks across all of the main centers of Korea, had been already in place well before its scheduled due date in 2005. The dramatic fall in prices and fast broadband rollout was the direct result of facilities-based competition actively promoted by the Government. There are now seven facilities-based operators offering customers various broadband access options. Of course, Korea's dense urban population, with 80% of the population living in cities or large towns, makes roll-out of broadband infrastructure a relatively low-cost undertaking. Establishing such connectivity in Indonesia will be a far more costly undertaking.

Table 2.1: Status of the Internet and Broadband services

	Korea	Malaysia	Thailand	China	Indonesia
Teledensity (2003)	70.1	44.2	39.4	21.5	8.7
ISP charge, total US\$ (2003)	3.1	3.7	5.6	7.3	10.7
Internet users per 100 inhabitants (2003)	61.0	34.4	11.1	6.3	3.8
Internet subscribers as % of telephone (2002)	46.4	45.0	24.8	23.2	8.3
Broadband as % of total Internet subscribers (2002)	91.47*	0.2	0.1	4.6	2.5

*This figure reached 100% in 2003

Source: ITU

20. The Government of Indonesia recognizes the imbalance in the provision of telecommunications infrastructure and services between urban and rural areas and also the importance of available and affordable access to ICT. Its policy objective is to ensure that every citizen has reasonable and affordable public access to communications services by the year 2015. Sector reforms in recent years have rapidly extended the reach of telecommunications to urban areas. Government and other organizations have tried to establish multipurpose community

³ Under facilities-based competition new entrants in a telecommunications market build their own infrastructure networks and compete for customers. Because power between operators tends to be more balanced, and the incentives of operators to agree on fees and conditions for interconnection are strong and interconnection of high quality service is easier to achieve. Facilities-based competition also forces operators to be in the lookout for new technologies that work best and give greater value for cost to their customers. Policy makers sometimes try to foster service-based competition by setting down rules that force incumbent operators to share and provide access of telecommunications infrastructure (or elements of that infrastructure) for a fee to be negotiated between the incumbent and the new service provider. High investment cost has been a major obstacle to infrastructure development in the past and service-based competition has been seen as a way to avoid duplication of cost and effort. In practice, however, that a powerful incumbent who owns the infrastructure has the upper hand. Since he is usually extremely powerful, he can circumvent efforts and regulation and, hence, service based competition is undermined and exists only in theory but not in practice.

telecenters to provide ICT access to rural un-served communities. Ensuring that villages have access to some form of telecommunications service should have a spillover or catalytic effect, spurring demand for services by the rural population. Even within heavily populated Java, the disparity in telecommunications penetration between urban Jakarta and rural areas is significant, as Table 2.2 below illustrates.

Table 2.2: Villages without Telecommunications Access in the Six Largest Provinces

Province	Villages without Telecommunications (%)
Jawa Barat	41.6
Jawa Timur	39.4
Jawa Tengah	57.1
Sumatera Utara	81.8
Banten	57.7
DKI Jakarta	2.6
INDONESIA TOTAL	69.2

Source: Department of Communications and Information Technology

21. The spread between urban and rural areas in terms of access to services is large. For example, while Java Island consists of 7% of the total land mass of Indonesia, it has over 70% of fixed telephone lines. The expansion of mobile services has not had a significant impact on the rural and remote regions: over 65% of all villages outside Java are completely without access to telecommunications and information services while the Jakarta metropolitan area enjoys about 40% household teledensity. The estimated 12 million Internet users, or less than 1% penetration, is one of the lowest in the Asia Pacific region. Internet access in eastern Indonesia is extremely limited and prohibitively expensive due to the long distance charges necessary to connect to dial up ISPs. Excluding Bali and Sulawesi, Eastern Indonesia has fewer than 15 Wartels (Internet kiosks).

22. At present ICT projects are scattered in different regions pursued by various organizations and the sustainability of these projects have been left unexamined. The World Bank's recent *Averting an Infrastructure Crisis: A Framework for Policy and Action* report recognizes that despite significant progress having been made in the telecommunications sector in Indonesia, much remains to be done to "systematically address the inadequate access to telecommunications and information services for the thousands of underserved villages in Indonesia." Enhancing the delivery of user services to rural areas, including market, weather and agricultural information, distance education, health care, entertainment, and e-governance, are all dependent to a large extent on ICT infrastructure. Acknowledging that access to telecommunications is good for development and that universal access is a desirable good must be backed by policy reform and strategies to finance regulatory change. Currently, Indonesia is not seeing sufficient telecom revenue, or sufficient investment into the sector (see Table 2.3). Efforts to change the pricing regime must run parallel to efforts in telecom financing through other avenues such as subsidy schemes which involve private and public partnership.

Table 2.3: Telecommunication Revenue and Investment

	Korea	Malaysia	Thailand	China	Indonesia
Telecommunication revenue per inhabitant (US\$) (2003)	456.3	195.4	66.9	44.2	8.7
Telecommunication investment per inhabitant (US\$) (2003)	136.6	41.1	6.4	21.3	8.1
Telecom investment as a % of telecom revenue (2003)	29.9	21.0	9.6	48.2	92.7

Source: ITU

Institutional and Regulatory Framework

23. The Government has recently approved the integration of telecommunications, post, broadcasting management, and information technology policy and coordination into one Ministry of Communications and Information (MCI). Three Directorate Generals (of Posts and Telecommunications, Broadcasting and Information Dissemination, and IT Utilization) will guide implementation of the country's e-Strategy. This merger means that Indonesia joins neighboring Asian Countries such as Singapore, Malaysia and Australia, which have similar agencies established to support and promote the development and implementation of ICT policies, strategies and standards. Singapore's Info-Communication Development Agency (IDA), Malaysia's MIMOS (IT Policy Development) and Australia's National Office of Internet Economy (NOIE) all provide support to implement ICT policy and further promote the development of ICTs in their country.

24. This updated structure is a first and significant step toward ensuring legal and regulatory mechanisms are in place to make telecommunications and information services available throughout the population. But it can fail in many respects if significant progress is not made in issuing new telecommunications licenses, policies on tariffs, interconnection charges, universal service provision, radio spectrum management, and strengthening the independent regulatory body. The merged institution does not necessarily mean improved rural information access without addressing these sectoral public policy issues, commitment and leadership to override special interest groups, and capabilities to address convergence issues as a result of services that can now be offered across a variety of competing platforms.

25. While the newly –reorganized Ministry of Communication and Information Technology now has the primary mandate for telecommunication policy and infrastructure, other important actors in terms of rural connectivity are the Coordinating Ministry for Economic Affairs that chairs the Telecommunications Sector Restructuring Team and the Committee on Policy for the Acceleration of Infrastructure Development, the State Ministry of State enterprises that represents the Government in its role as shareholder in Telkom and Indosat. Among the sectoral Ministries, the Ministry of National Education , especially the Directorate for Technical and Vocational Education (DTVE) and to a lesser extent Ministry of Agriculture are also engaged (see Chapter 2 for details). Under pressure from the Parliament (DPR) and the industry association (MASTEL), the Government set up a new regulatory body, BRTI in 2003. BRTI is chaired by the Directorate General of Posts and Telecommunications - DGPT (now part of MCIT) and by four others chosen from the public. While this is evidence of steps taken to improve the regulatory environment, it represents only a limited step towards an effective credible non-Ministerial regulatory agency that would compare with international best practice (World Bank, 2004). The Government, through the National Development Planning Agency (BAPPENAS) is currently determining the most optimum structure for the national telecommunications industry in fixed communications after duopoly, including identifying the required policies and regulations to implement full competition.

Public Policy Issues in Rural Connectivity

26. The current picture of inadequate access to telecommunications in rural areas of Indonesia and unsuccessful initiatives to date to expand rural connectivity reflects the interplay of multiple factors including:

- A significant degree of commercial unattractiveness of telecommunications investment in these areas.
- Negative impact of licensing, interconnection arrangements, pricing, and other regulations on incentives for investment in rural telecommunication networks.
- The lack of facilities-based competition and asymmetric regulation to address remaining incumbent powers to set prices and control markets.
- Significant operating and maintenance costs as a percentage of capital costs in small and remote areas, including high costs of leasing international Internet bandwidth and the costs of staffing technical/marketing personnel.

Investment Needs

27. The Government of Indonesia acknowledges that, as the world's largest archipelago country, a significant level of investment would be needed to rapidly accelerate rural telecommunications connectivity. PT Telkom, now 49 percent privately owned, is the sole provider of fixed line services in Indonesia, and seems unlikely to risk its chartered mission to be a profitable world class operator by meeting the demand of non-profitable investments in rural communities, especially since it fell behind in its roll-out plans following the 1997 crisis. Thus, Government has established under Law 36 a Universal Service Obligation (USO) to provide basic telephony services in 43,022 villages outside Java by 2015 based on the adoption of various scaleable technology platforms that take into account local topography. This is a tall order, and there is no guarantee that public resources will be used in the most efficient way. To meet the original targets of 7,500 and 17,000 villages with at least one phone in 2003 and 2004 respectively, the Government intended to fund from the state budget Rp. 912 billion. However, the economic crisis and the Rupiah's depreciation that impacted the sector resulted in an actual deployment only of 3,010 and 2,600 villages in 2003-2004 in Sumatra, Kalimantan, Eastern Indonesia, and Jawa/Banten. An estimated 30% of those connected have reported poor levels of service, with lines not working and/or not working for some time, and dramatic operational and maintenance costs.

Private Sector

28. For 2006-2009 the government is mobilizing non-tax revenues to finance further connections. Under Government Regulation No. 28/2005, telecommunications operators are now required to contribute 0.75 percent of their annual gross revenues (minus provision for bad debts and interconnection charges) into a Universal Service Obligation fund administered by MCIT. The new USO program is expected to become effective in January 2006. This would increase the size of the budget upwards of Rp 400 billion annually. This will be a significant increase over previous years, but it has to be recognized that this measure alone will not provide the only source of funds for a new rollout in remote and rural areas, rather it would only provide some subsidy of investment costs in areas where the market will not go it alone. MCIT estimates the total cost of USO provision is Rp 5.095 trillion or US\$525.3 million to 2009. The projected revenues from operator contribution is US\$196.4 million. The estimated financing gap would then be in the order of US\$329 million over the period. However, as noted in Annex 2, *taxing telecommunications to build-out telecommunications is only one source of funding for any new rollout and is designed to provide some subsidy of investment costs in areas where the market will*

not go alone. As also noted below, other countries are using universal service subsidies to help generate private investment in the sector. Such programs rely on the private sector for major decisions regarding technology, and use a bidding process to ensure the most efficient use of public resources.

29. The USO fund is currently being administered by the Directorate General of Posts and Telecommunications (DGPT). However, several implementation issues remain including - the realism of cost estimates, adequacy of USO financing, practicalities of day to day USO fund management/administration, performance monitoring of operators, appropriate technology, sustainability/equipment maintenance, and cost recovery mechanisms. Based on Government guidelines for implementation of universal service support, the DGPT has selected operators through a tendering process to provide access to telecommunications in rural areas to 18,522 villages. Five companies were recently awarded contracts to implement different technologies (VoIP--PT Pasifik Satelit Nusantara (PT PSN), VSAT—PT Citra Sari Makmur, Radio - PT Telkom, Portable Fixed Satellite—PT PSN, and Cellular (CDMA) services—PT Mandar Selular Indonesia) in these villages. However, in such a fast changing technological scenario as exists presently with commercially viable wireless technology and the bundling of services such as cable/satellite or Internet to reduce the cost of telecommunications service provision, it would be difficult for any regulatory agency to “get the technology right.” While the Portable Fixed Satellite seems to be the preferred platform at the moment, this segment’s market share fell from 99% in 2003 to 62% in 2004 as average unit prices per line increased 15% from US\$1,660/line to USD\$1,910/line. Making technology specific requirements for service provision and imposing them on service providers has shown in other countries to impede growth.

30. Indonesia needs to continue to develop competitive markets for ICT businesses ensuring that the private sector will be able to grow efficiently. In so doing, there is a need to determine the process of migration to a fair (full) competition after the existing transitional phase (duopoly) in the fixed telecommunications industry which plays a critical role in determining the affordability of access.

Opportunities in New Technologies

31. There are demonstrated opportunities to deploy appropriate new technologies suitable for unserved or underserved areas such as new low-cost “voice over Internet applications”. And there are successful cases of competitive “output-based aid” (OBA) type minimum subsidy programs being used around the world to allow the market to determine which operators will best provide services to specific high-cost areas that are otherwise uneconomic to serve. Competitive bidding for such subsidies also holds promise for the provision of schemes to increase affordability of bandwidth and to enhance SME development through multipurpose telecenters in rural communities, the development of content, applications, and training. Further good news is that experience across a wide range of developing and industrial countries indicates that people everywhere are willing to spend part of their income on telecommunications services, typically 1-2 percent of GDP in rural areas.⁴

Affordable broadband IP platforms

32. To provide rural communities with voice and data communications, broadband services no longer need to be considered a luxury that only the middle and upper urban classes can enjoy. A

⁴ Bjorn Wellenius, “Extending Telecommunications beyond the Market: Toward universal service in competitive environments,” World Bank Viewpoint Note No. 206; “Financing Telecommunications Needs in the Developing World: A World Bank contribution to the World Summit on the Information Society Working Group on Financing ICT,” World Bank Global ICT Department, February 2005.

range of technologies including wireless and VSAT can be deployed to bring affordable Internet and Voice over IP (VoIP) to remote areas with highly challenging topography. IP can be provided to rural areas through the broadband network that will also serve as a conduit for the VoIP traffic, while at the same time allowing other applications to share the same infrastructure. By creating the demand for telecenters and expanding the usefulness of connectivity, an induced demand for improved infrastructure is created, particularly if there is competition to serve the market. This is particularly relevant to meet the needs of rural women who benefit enormously from the access to multimedia technologies given the low literacy levels (see also Chapter IV for more details).

33. The recent Aceh rescue efforts showed that broadband Internet facilities can be speedily deployed. Once the Internet became available at a number of points through efforts of Telkom and other operators quick to mobilize VSAT and satellite communications equipment, it was used to support relief and recovery efforts. With information coming from the stricken areas, rescuers had a better idea of what each of these areas most urgently needed.

34. Wi-Fi and/or Wi-Max last mile IP infrastructure linked to existing satellite, fiber optic, and cellular backhaul networks, providing both Wireless Internet Service Provider (WISP) and Wireless Local Area Network (WLAN) services including VoIP to local schools, other public institutions, and the community at large offer a low-cost alternative to fixed line and CDMA technologies. New wireless technologies such as ultrawideband which is currently licensed in the United States only for limited, very low-power applications, in part because it spreads a signal across already-crowded portions of the broadband spectrum are now being developed in countries such as Tonga (where the spectrum is much less congested) and the population spread out over dozens of islands, making it a test bed for a next-generation technology that could transform the economics of internet access. The Swedish wireless company Ericsson has developed a small cellular telephone system called a mini-GSM, that local operators can use to offer cell phone service to a small area at radically lower cost than conventional equipment entails. Packaged for easy shipment and deployment, it provides stand-alone or networked voice and data communications for up to 5000 users within a 35-km radius. The MIT Media Lab in collaboration with the Indian government, is developing low-cost devices that allow people to use voice commands to communicate – without keyboards – with various Internet sites in multiple languages. These new access devices promise to be far less complex than traditional computers but would perform many of the same basic functions. Again, these are particularly relevant to serving the needs of rural women. (Prahlad and Hammond, 2002).

Box 2.1. Telecommunications--Aceh and North Sumatra

Telecommunications suffered moderately severe damage, primarily to the fixed connection services and to receiver facilities for cellular phones. There was a heavy loss of connections in Banda Aceh and Meulaboh, amounting to 28,000 customers or 40 percent of connections. Total damage and losses are estimated at about Rp. 203 billion, comprising about Rp. 9 billion for postal services, Rp. 5 billion for USO connections, and Rp. 162 billion for fixed connection services including cellular. Some implications of the disaster for the telecommunications sector are:

- The need to accelerate the access of remote and isolated villages to telecommunications services, particularly since all but 8 of 111 lines provided to remote villages were damaged.
- The need to review the relative benefits of restoring the fixed line network versus moving to a fully wireless system for urban households.

By integrating VSAT IP technology and broadband wireless technology, it is feasible to serve several communities at once thus achieving a more affordable initial investment cost average estimated at around US\$600/line.

Box 2.2. VSAT IP Solution for Warnets/Wartels

Ministerial Decree No. 21/2001 establishes that multimedia service providers can provide IT services to include Internet access, pay TV and Internet telephony that can carry voice using Internet Protocols. Such new technologies are of considerable importance to helping in bridging the digital divide within the country. One of the key constraints to sustained operations in Indonesia's telecenters is the availability and cost of bandwidth. Many urban Warnets (Internet kiosks) have closed down since 2001 (an estimated 1,000 out of 2,500 Warnets, including many of the WasantaraNet points of presence in small towns owned by PT Pos Indonesia) because of poor quality of service due to over subscription and the resulting congestion, and the high cost of leasing international Internet bandwidth which pushes up the price of Internet usage.

In 55 locations throughout Indonesia, PT StarCall Siskom has deployed a satellite-based IP solution that provides a 2-way broadband network cost effectively for Wartels and Warnets in order to provide high quality Voice over IP and Internet access services. The Wartels can use the VoIP lines provided to make long distance (Domestic and International) calls at a fraction of the standard rates. Likewise, Warnets can enjoy the affordable and high quality broadband Internet access since the VSAT hub is directly linked to Singapore where the global Internet terrestrial backbone is readily available and the price is much cheaper than in Indonesia.

This IP optimized VSAT system recognizes different traffic types and assigns VoIP packets the highest priority within the data transport stream, which minimizes the impact of data traffic on voice packets resulting in a clear voice quality. In addition, this IP-based VSAT technology allows the operator to charge the customers (Wartels and Warnets) for the actual usage of the traffic only. There are no monthly recurring VSAT fees commonly charged to VSAT users. Wartels are charged based on the actual voice calls made and Warnets are charged based on the Internet bandwidth subscribed and minutes of usage per month. If there is no traffic, then there is no monthly payment.

This is an ideal scheme for rural telecenters and Kabupatens since villagers do not usually make many phone calls and they normally cannot afford to pay an expensive VSAT monthly subscription charge. The Wartels or Warnets can offer both phone and Internet access services via wireless to their neighborhood within a 1-2 km radius so their business can grow.

The new technology may change how sustainable rural telecenters can or cannot be both in Indonesia and in other countries, such as Nepal and Sri Lanka, where the roll-out of telecenters is supported by World Bank projects.

Public- Private Partnerships

35. Under the current *Otonomi Daerah* (Regional Autonomy) legal structure, *Kabupaten* (District) level governments have become key players in the success or failure of rural development initiatives. Local governments are empowered to enact laws (Peraturan Daerah or *PERDA*) related to all areas of development including taxation and business regulation. This has led to many well documented problems (see Box current example at right) which are adversely impacting the business and investment environment nationwide. The central government currently is putting in place mechanisms to monitor and, if necessary, override regressive local legislation (such as the *PERDA* review online database being built by the Ministry of Home Affairs with World Bank support).

36. While it is easy to view these local actions as nothing more than a money grab, it is important to understand the context in which they are occurring if a politically workable solution is to be found. *Otonomi Daerah* and the recent advent of direct local elections of district heads have resulted in enormous pressure on local government officials, who are now responsible for organizing and funding most government services, while receiving budget allocations from the central government which are generally inadequate for the task.

37. To a great extent, their political survival requires creating additional sources of income, palatable to the local electorate - to develop politically popular local projects, and meet the requirements of the patronage system which dominates local politics. If no other options for creating this local income are available, the obvious candidates are regressive taxation and corruption, both of which have increased markedly at the district level under regional autonomy. Other public sector institutions are in dire need of a sustainable source of local funding as well, notably schools and health care institutions.

38. A potential remedy to this situation, and to the reluctance of the private sector to invest in ICT infrastructure in rural areas as well, could lie in the development of community owned, privately managed low-cost wireless networks. Indonesia has a long tradition of public sector involvement in business, and while the military is currently, and rightly, divesting itself of its commercial holdings, the regional autonomy era presents opportunities to jumpstart rural infrastructure development while creating sustainable sources of local funding.

39. Public Private Partnerships, structured around community investment and ownership in local infrastructure managed professionally by private sector partners, have proven effective in developing rural telecommunications infrastructure (e.g. the NTCA experience in the USA) and a number of legal structures exist under regional autonomy to pursue similar programs.

**Box. 2.3 Local Government in East Java
Halts New Drilling Operations**

Dow Jones, JAKARTA 15 April 2005

Bojonegoro regency administration in East Java has stopped PetroChina Co. and state-owned oil and gas company Pertamina from drilling new oil wells in Sukowati oil field, demanding a 10% stake in the field, a government official said Thursday.

The interruption is the latest example of how wide-ranging autonomy granted to regional governments after former President Suharto stepped down in 1998 is creating problems for investors, amid the government's efforts to reverse a steady decline in crude oil production.

In 2002, a local unit of ChevronTexaco Corp. relinquished an oil block in central Sumatra after the local government demanded to take over operations of the block.

Box 2.4

The Potential of Public Private Partnerships (PPP) to Provide Rural ICT Access

Cited as a best practice example by the 2005 *Indonesian Government e-Strategy*, a promising PPP is currently underway in *Sumedang, West Java*. Utilizing VSAT and Wi-Fi infrastructure procured by the District Government, a local ICT company, PT KampungCyber, contributes the professional management, operational costs and business relationships necessary to deliver low-cost wireless data and voice services to schools, SME, Internet cafes and other clients throughout the community.

The local government's investment was less than \$50,000, and the government is not required to commit any additional resources to the project. Commercial services were launched in January 2005, and the business is breaking even after only four months of operation.

Savings from use of local network VoIP and digital data sharing alone will allow the local government to achieve ROI on its investment within the first two years. Profit-sharing from commercial ISP and WLAN network services will be rolled back into developing e-Government services and technology related human resource development.

40. Outsourcing network management could free local governments, schools and other community groups from the twin burdens which have caused the failure of previous attempts to develop public-sector-only infrastructure (e.g. Siskomdagri) - staffing specialized human resources and funding ongoing operating costs - enabling scarce budget resources to be directed toward capacity building and program development, while eliminating the risk of getting bogged down in the technical issues of day-to-day network management and maintenance. Sound business management by the private sector would promote sustainability, and including education and health care groups along with government in the local stakeholder group would promote transparency and equitable distribution of profits. However, the government needs to serve as a facilitator and motivator of such partnerships. The recent (and on-going) experience of the Air Putih Foundations's work in Aceh is a case in point (see Box 2.5)

Box 2.5. Air Putih in Aceh – A Cautionary Tale

Air Putih, which was originally an online chat group of IT professionals has, along with an alliance of computer enthusiasts, fighting to apply the powers of the Internet to help coordinate the reconstruction and rehabilitation in tsunami-hit Aceh/N. Sumatra. Coordinated and supported by the Indonesian Information Technology Federation, an association which includes nine industry groups, they have formed the Aceh Media Center, an organization devoted to applying information technology to solving the humanitarian disaster of the province. They've set up wireless Internet kiosks across the city for aid groups and journalists. Their website (acehmedia.center.or.id/eng/) boasted more than 100,000 hits in less than a month of operations. The site includes frequent news updates and has a database of missing persons. Relief groups say that the service has been invaluable in helping them do their work as Banda Aceh slowly rebounds. On Dec. 27, a day after the disaster, donated equipment began to pile up, including computers, wireless devices, fiber optic cables, and VSATs. However, Air Putih has had to face a regulatory nightmare in regard to the importation of this specialized equipment in terms of the licensing, tax exemption, frequency allocation etc. that has in many ways hampered its effectiveness. Getting approval of the fiber optic equipment for example, involved getting the approval of 23 government departments which took 3 months. Due to delays in getting tax exemption status, Air Putih now faces a bill of 290 million rupiah from the Ministry of Finance that has, to date, yet to be resolved.

Sources: Christian Science Monitor, January 25, 2005; Air Putih presentation at workshop, June 7, 2005

How to Serve Uneconomic Areas: Lessons From Other Countries in Increasing Access

41. The Bank recommends that the Government use its USO program to help generate private investment in the sector in a manner that ensures the most efficient use of public resources and does not tax one part of the telecommunications network to provide investment funds for another. This would entail auctioning universal service projects to overcome Indonesia's low penetration rate for telephone service. From a handful of countries in Latin America that pioneered minimum subsidy projects in the mid-90s, the ranks of countries implementing such projects are growing

rapidly. The strategy is being applied by countries of all income levels as well as to other sectors. Box 2.4 provides an overview of Output-Based-Aid (OBA) telecom projects in selected countries.

Table 2.4: Examples of minimum subsidy auction process for public rural telephones

	Chile	Colombia	Dominican Republic	Peru	Nepal
Projects	200	6	1	7	1
Bidders	Numerous	2 to 7	2	2 to 5	2
Average subsidy per locality (US\$000)	\$3.6	\$4.6	\$6.8	\$9.5	\$11.2
Localities served	6,059	7,415	500	4,420	1,064
Population served (m)	2.2	3.7	1.0	1.6	4.0

Source: World Bank, The Global ICT Department

42. Most commonly, the implementation mechanism to telecommunications access is the *minimum subsidy auction*, in which the market is used to determine whether, and how much subsidy is needed to reach a particular set of universal service targets, and who can provide the service at minimal cost. This mechanism ensures that the amount of subsidy awarded by the government is the lowest that is compatible with meeting the stated objectives, and hence that public funds are used efficiently.

43. These OBA projects promote the provision of services to unserved populations. They provide a one-time subsidy for rural telecommunications service. The subsidy is disbursed directly in tranches to providers, with each tranche paid on achievement of specified rollout milestones while maintaining certain service quality and availability obligations. To select rural telecommunications providers for OBA projects, bidders are required to prepare applications in accordance with procedures and requirements in a Request for Applications document. In their applications, bidders have to provide evidence that they meet specified eligibility requirements, including minimum levels of operational experience, financial capacity, and domestic participation. They also have to demonstrate that their proposed services and equipment fulfill certain technical specifications. Bidders specify the proposed amount of the OBA subsidy. Subsidy and licenses are issued to the qualified bidder that proposes the lowest subsidy.

44. After the contract award, the successful operator builds the infrastructure and operates it during the prescribed period. The agreed subsidy amount is designed purely to cover a portion of the initial investment and start-up and is transferred to the operator upon satisfactory completion of construction milestones. Thereafter, operating costs must be met from tariff revenues, although, as a way to ensure continued provision of service after the initial construction period, some payments may be deferred for disbursement at specified intervals.

45. The experience of Chile is often cited in extending payphone service to rural and low-income urban areas with low income and low telephone density, and the value of this approach to bringing telecommunications access to rural areas when the business cases for connecting these areas were not favorable. Subsidies were offered to private operating companies willing to invest in these services. The subsidies were allocated through competitive tenders and financed by the national budget. Over the six-year period 1995-2000, the telecom regulator SUBTEL (Subsecretaria de Telecomunicaciones) tendered 7,850 localities, specifying a maximum amount of subsidy for each locality. Operators and service providers were invited to bid for the amount of the subsidy they would need to execute payphone projects in these localities, provided

that this subsidy would not exceed the maximum amount. Based on the lessons learned from this program, the Government has been applying the same scheme to bring Internet access to 750 towns in rural Chile. An estimated investment of \$38.7 million will require Government giving a subsidy of \$9.0 million and the private sector providing the rest. This means that the private would put \$2.6 dollars for every \$1 dollar of subsidy from the government. The towns have been selected based on their poverty level and on their lack of service. Similar results have been obtained in other countries as shown in Box 2.4.

Key Recommendations

46. The priority public policy issues for development of the sector are not new.⁵ They include competition, regulation, and dramatically improved rural access to telecommunications and information services. Each of these priorities is related to each other. Thus, competition is a powerful incentive for excellent performance. Credible and effective regulatory institutions and processes support competition and investment. And improved rural access depends on investment, competition, tariffs, network interconnection, and the most effective use of scarce subsidy funds.

R1 Promote competition, particularly facilities-based competition

47. While competition is flourishing in the profitable mobile market, the powerful position of Telkom, coupled with the relatively weak regulatory institution, increases risk for competitors, which in turn discourages investment and increases the cost of capital in the sector. And while mobile telephony is a competitive fixed line substitute for many customers, this is not the case for broadband access. In many areas, there have been complaints that Telkom uses its control of the 'pipe' to buttress its own value-added service 'last-mile' services. Many ISPs complain of problems of securing adequate numbers of high speed phones, and of the high cost of leasing international Internet bandwidth which pushes up the price of Internet to users. The Government has not, like Korea and Chile for example, promoted facilities-based competition that would allow small operators and VSAT and wireless operators to establish themselves with alternative technologies and bring forth additional competition to the telecommunications market.

R2 Strengthen regulatory independence

48. Some important progress has been made in recent years, including establishing the Indonesian Telecommunications Regulatory Body (BRTI) in 2003 as a watchdog for the sector. In April 2004 BRTI issued eight Ministerial Decrees concerning regulation of key aspects of the telecommunications industry with the aim of increasing competition in the sector. The long delayed decrees concerned interconnection, fixed wireless access, the USO, and competitive safeguards. However, industry is still waiting for the critical Modern Licensing decree that will regulate the obligations of each operator to supply technical data for the Telecommunications Clearing System (SKTT). BRTI's actual independence and clout is questionable and critics have called for the body to be reformed to ensure better regulation of the sector and maintain the momentum of liberalization. BRTI does not meet criteria of a strong, independent regulatory body comparable to international standards.

⁵ See also "Indonesia: Averting an Infrastructure Crisis: A Framework for Policy and Action," The Telecommunications Sector, The World Bank, 2004.

Box 2.6. Examples of World Bank Projects with an OBA Component

The Output-Based Aid (OBA) mechanism is designed to provide operators an incentive to service rural or underserved areas through a subsidy scheme in which the lowest bidder is awarded the license. OBA is seen more and more as an effective instrument to overcome access gaps. OBA projects are normally processed either as Technical Assistance or Specific Investment Loans.

Example 1:

Project: Nepal - Telecommunications Sector Reform Project

Commitment amount: \$11.8 million (OBA component only)

Approval (year): 2002

Project description: The OBA component of this project will support the negative concession for rural service; license to provide telecommunications services in the Eastern Development Region. The operator is required to provide at least two public access lines in each of 534 village development committees (VDC) and operate services in these VDCs for at least 10 years. License awarded to STM Telecom Sanchar Private Limited on November 21, 2003. Posts of network have been installed and commissioned, and operator has started providing services in 107 of the VDCs. Service roll out in all 534 VDCs will be completed by June 2005. Another \$1.67 million is earmarked for a public ICT access component (with telecenter-type facilities).

Example 2:

Project: Nicaragua - Telecom Reform

Commitment amount: \$1 million (OBA component only)

Approval (year): 2000

Project description: The approach to be used is the negative concession for provision of payphone and possibly Internet services in rural areas, under one selected pilot project. Based on this experience a \$10 million follow-up operation is being proposed to scale-up the experience gained through the pilot throughout Nicaragua. Regulatory instruments and tender documents ready. Exact location of the pilot under discussion. TA to create telecommunications development fund to improve access to telecommunications and information services in rural and underserved areas. TA includes legal creation of the fund, demand studies, regulations and guidelines and bidding documents for first round of bidding. A small investment into the fund is also foreseen, which will also finance telecenters.

Example 3:

Project: Uganda - Private Investment Promotion Project

Commitment amount: \$5.5 million (ICT component only)

Approval (year): 2002

Project description: The ICT component is fully OBA-related, aimed at implementing subsidy schemes, as the telecom sector reform agenda was successfully implemented under a previous project. OBA scheme involves negative concessions for rural areas, including public telephone services, Internet Points of Presence (PoPs) and telecenters. The public telephony component is targeted at 154 rural sub counties. Estimated subsidy requirement USD 6 million, of which WB funding covers an estimated USD 5 million. Drafting of tender documents has recently been completed. Pre-qualification for the public telephony component was conducted in early 2004, in which the three main telecom operators in Uganda successfully pre-qualified. In parallel, a bid for 30 Internet PoPs in as many district capitals has recently been published. The vast majority of Uganda's internet users are concentrated in Kampala (the capital), but under the Rural Communications Development Policy, it is a goal to establish a PoP in every district by 2005 - a goal that would make Uganda one of the most 'wired' countries in Africa. Out of 17 licensed Ugandan ISPs, five submitted bids by the given deadline of 3 January 2005. Each applicant submitted a bid to roll out a certain number of PoPs for a certain level of subsidy.

Source: "The World Bank Group Financial Instruments and their contribution to the Information and Communication Infrastructure (ICI) landscape," Global ICT Department, February 2005.

R3 Adjust and rebalance tariffs for fixed services

49. The current practice of seeking Parliamentary endorsement of proposed telecom price changes inevitably involves the politicization of pricing. This approach introduces enormous risks for investors and thereby discourages investment. The government decision in January 2003 to postpone the 15% tariff increase announced only a few days previously has exacerbated concerns about this critical element which affects investment decisions. Once an independent regulatory body is in place, that body should become responsible for price regulation.

R4 Establish a credible and equitable interconnection regime

50. A transparently managed and non-discriminatory interconnection regime under which major providers are obliged to provide cost-effective rates and are prohibited from engaging in anti-competitive cross-subsidies is a key prerequisite for effective competition in the sector. Telkom currently occupies an overwhelmingly dominant position in the fixed market and complex interconnection issues are arising as Indosat seeks to become a competitor and Telkom divests its stakes in other operators. DGPT has acknowledged that it is poorly equipped to deal with the emerging problems in this area. BRTI lacks the capacity to monitor, enforce, and adjudicate on interconnection rules and agreements. Moreover, Indonesia is likely to be much more effective in interconnection when there are several facilities-based competitors with a vested interest in connecting to their competitor's customers.

R5 Improve licensing and radio spectrum management

51. Procedures for the award of licenses for telecommunications network and service operators remain ill-defined and non-transparent. Particular attention needs to be given to managing the use of radio spectrum. Implementation of improved management and licensing arrangements has the potential to optimize the economic benefit of this scarce resource, generate substantial revenues, and also improve rural access to telecommunications and information services. The licensing regime is the same in rural and urban areas, which means that due to lower user density in rural areas profitability for operators is not generally achievable.

52. Government is missing opportunities to expand access by optimizing use of spectrum and by not enforcing fair and effective competition in VoIP licenses. For instance, allowing utilization of 2.4 Mhz spectrum for locations with low density frequency usage/traffic, especially in rural/remote areas, without government licenses and fees, would facilitate the growth of school and rural community networks. For operators granted the ITKP/VoIP License with single stage access code 01007 and double stage access code 17007, the Bank recommends that these access codes be available and accessible in all Wartels and Warnets nationwide or at least in 30 major cities in order to pass along benefits both to Wartel/Warnet users in terms of cost savings when they make domestic and international long distance calls as well as Wartel/Warnet owners since the buying price for long distance using VoIP is much lower than the current rates.

53. In a recent Government pilot project undertaken in cooperation with the Indonesian Wartel Association (APWI) that installed VoIP equipment in 200 Wartels in Jakarta, Bandung, Semarang, Surabaya and Cikarang to introduce VoIP services to the public at competitive rates, DGPT received reports that Telkom was abusing its position by threatening Wartel owners to have their PSTN lines disconnected by Telkom if revenue to Telkom dropped significantly. Review of the pilot showed that the Wartels' overall income generated from domestic long distance calls and international long distance calls increased by 17% and 43% respectively. In order to create fair and effective competition, in addition to having Telkom VoIP 017, the Bank recommends the VoIP access codes 17007 and 01007 be used for all SMEs nationwide from their

own location to save their business communications costs, thereby significantly improving their competitiveness and expanding access to telecommunications services.

III. ICTs at the Service of the Rural Poor

54. Today's challenge is to identify feasible ways of expanding the access and application of information and communication technologies to provide services to improve the income and welfare of Indonesia's rural poor. An intervention is considered successful if:

- i. it helps reduce rural poverty and
- ii. its beneficial effects are sustainable.

A second order objective, important in the Indonesian context, is that ICT development interventions should also:

- iii. strengthen the efficiency, accountability and transparency of the country's public institutions and advance national integration while strengthening decentralized governance.⁶

Analytically, ICT applications in rural development may be classified as those that: provide decision support to public administrators for improving planning and monitoring of developmental programs; improve services to citizens and bring transparency; empower citizens through access to information and knowledge; and expand private sector development (Bhatnagar and Schware, 2000).

Rural Poverty

55. The majority of Indonesia's poor live in rural areas (Table 3.1). The poor include: people living in rural communities, especially in the more remote islands with limited infrastructure; landless rural workers and urban workers that depend for survival on low wage occasional employment in the informal sector; farmers cultivating low-value crops in very small parcels of land. In 2002, 58 million workers were classified as informal workers. The majority of these informal workers were poor, and 42.7 million (73%) resided in rural areas (Heriawan [2002]). In 2002, of the country's 40.6 million agricultural workers, 37.3 million were categorized as informal workers. Geographically, the bulk of the poor live in densely populated Java-Bali, but the incidence of poverty is high in Eastern Indonesia and in remote communities. Rural poverty affects women and children and ethnic minorities most severely.

Table 3.1. Incidence of Poverty in Indonesia, by Rural-Urban Area and by Region

Region	Urban		Rural		All	
	No of poor	(%)	No of poor	(%)	No of poor	% of National
National	6,839,389	20.8	26,082,024	79.2	32,921,413	100.0
Java-Bali	5,106,318	26.3	14,296,851	73.7	19,403,169	58.9
Sumatra (excl. Aceh)	812,435	13.5	5,224,947	86.5	6,037,382	18.3
Kalimantan	167,557	10.0	1,507,385	90.0	1,674,942	5.1
Sulawesi	165,502	5.9	2,617,569	94.1	2,783,071	8.5
Eastern Indonesia (excl. Maluku, Papua)	538,091	18.1	2,435,272	81.9	2,973,363	9.0

Source: Susenas 2002 and McCulloh, reported in Timmer [2004].

⁶ "Any new poverty strategy must include specific measures that will change the day-to-day relationships between the poor and civil servants, or little will actually change." (World Bank [2001], page vii.)

56. To have significant impact on the rural poor, ICTs must address **rural poverty and its causes**. Indonesia's rural poor operate in a low productivity context. They possess few assets, and have limited access to low-cost high quality services (e.g. transportation, education, health), weak bargaining position, and few off-farm income earning opportunities.

✓ *Sustainability*

57. The benefits derived from ICTs should also be sustainable. A systemic concept of sustainability that goes beyond the immediate effects of an individual intervention or facility is essential. In the case of telecenters, for example, commercial telecenters, i.e. Warnets, are not all individually 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 telecenters or services started by State Action **need not survive**. What is important is for these services to continue - provided by either the initial facility established through government or donor funding, or by other institutions, public or private, that arise subsequently to meet the increase in service demand stimulated by the initial program.

✓ *Governance*

58. ICT development often requires complex institutional changes, interagency coordination, and, in the case of e-Government, changes in the flow of administrative procedures; i.e. in "back office operations". In India, some attempts to use telecenter operators as a means of bypassing bureaucratic obstacles often falter following a change in the government leader that championed the program.⁷ These disappointments cannot be blamed on "lack or waning leadership." Public sector incentives are different in very fundamental ways from those operating in the private sector (Kraemer and King, 2003). ICTs and telecenters can help expedite communications and data exchange; but there is simply no substitute for real reforms that ultimately change administrative processes and reduce opportunities for rent seeking by public officials. And realigning public sector incentives is difficult, particularly in fields that are transaction intensive and where the specificity of objectives is low; i.e. where the practical feasibility of monitoring the output performance of public services is limited. (Fukuyama, 2004). Priority is therefore given here to ICT interventions that require minimal or gradual institutional changes and that are low risk.

Kinds of Interventions

59. Three kinds of interventions critical to rural poverty reduction are considered.

- i. Efforts to expand widespread and equitable **access** to ICTs and to the services enabled by ICTs.
- ii. provision of government services online: **e-Government** specifically directed to serve the needs of the rural poor.

⁷ The experience of the Gyandoot and the Sustainable Access in Rural India (Sari) projects illustrate the point. For encouraging reviews of the Gyandoot experience see (www.dhar.nic.in/GYANDOOT.htm) and Gamos & Big World [2003]. For a more sober update see IIM-Ahmedabad [2002]. For a review of how the Sari project managed to provide valuable e-government services for a while but subsequently faltered, see Srinivasan [2004] and Kumar and Best [2005].

iii. **digital literacy** and **community development** services.

Access

⇒ *Mobile Telephony*

60. Telephony is the preferred mode of communication of most people, and as new Internet applications are arising, the mobile telephone is revolutionizing the way people interact with each other, look up information and get services (Castells et al ,2004). Mobile telephony requires no written language skills and little knowledge of technology. As its geographic reach expands and new applications are developed, mobile telephony will become an increasingly powerful way to communicate and provide public services to the rural poor. Some of the services that the State can begin to provide using the internet, can later on be adapted to increase their power and reach through mobile telephony.

⇒ *Telecenters*⁸

61. Indonesia's Wartels have been enabling access to telephone services to low-income people. Warnet's - telecenters providing Internet connectivity, mainly in urban areas - are now enabling people to carry out research, complete school work, access information on the web and communicate with peers and friends at relatively low cost (Tables 3.2 and 3.3).

Table 3.2 Uses of the Internet by Sample of Users of 15 Yogyakarta Warnets

Purpose	Percentage of Respondents who Ranked a Service as Used during this session		
	Male	Female	All
1 Search for information	94%	97%	95%
2 e-mail	89%	87%	88%
3 Chatting	70%	73%	71%
4 Reading News Online	68%	62%	66%
5 Research	59%	49%	56%
6 Computer games	43%	28%	38%
7 Download of software for professional use	40%	33%	38%
8 Download of software for amusement	40%	33%	38%
9 Downloading music	36%	33%	35%
10 Visiting pornographic sites	34%	13%	27%
11 Doing business	29%	22%	27%
12 Other IT services	34%	27%	32%
13 Other non IT use	24%	20%	23%
14 e-shopping	21%	16%	19%
15 Gambling	18%	12%	16%

Source: Data from survey carried out by Kristiansen, Futurholt, and Wahid, 2005. See details in annex ? esp. Table A4, where user priorities are given.

⁸ This section is further elaborated in the following chapter on Community Access Centers. The term "telecenter" is often used in connection with "donor sponsored" multipurpose "community centers". Here the term is used more broadly, in reference to locales that provide public shared access to ICT services, regardless of services provided or who "owns", sponsors or manages the center. (Proenza [2001]).

Table 3.3. Characteristics of Sample Warnet Users in Yogyakarta

	Number	%
Gender		
Female	86	32%
Male	184	69%
No. of respondents	270	100.0%
Marital Status		
Single	250	93%
Married	20	7%
No. of respondents	270	100%
Nationality		
Indonesian	266	99%
Other	4	1%
No. of respondents	270	100%
Education		
Elementary	12	4%
Junior High	18	7%
Senior High	138	51%
University	100	38%
No. of respondents	268	100%
Employment		
Student	195	73%
Entrepreneur	25	9%
Government employee	2	1%
Employee in a private company	33	12%
Unemployed	12	4%
No. of respondents	267	100%

Note: No. of female and students is probably underestimated. (ANNEX A)

Source: Kristiansen, Futurholt, and Wahid, 2005.

⇒ *Commercial Telecenters*

62. Given their low cost and because there exist well developed applications and services deliverable through the Internet, telecenters (Wartels and Warnets in this case) constitute a valued resource for urban ICT users in Indonesia. In 2001, Warnets were being used by about 30% of urban SME exporters in 8 Indonesian cities (Suriadinata [2001]).⁹ In November-December 2003, Kristiansen, Futurholt, and Wahid [2005] found Yogyakarta's Warnets were being used for a variety of purposes, including 27% of users doing business (Table 4). As is most often the case, communications – email and chatting – and search for information were primary purposes for using the Warnets. They were also being used for less socially acceptable purposes like visiting pornographic sites (27%) and gambling (16%). Combined with a suitable telecommunications policy, telecenters can make access to ICTs affordable by sharing the cost of connectivity and computers among users.

63. Peru has a dense network of about 5,000 *cabinas públicas* (the Peruvian equivalent of Indonesia's Warnets), most of them located in Lima and other urban centers. Open competition in telecommunications, and among ISP's and *cabina* operators, have resulted in increasingly lower service costs. In May-June 2004, 49% of Lima's telecenter users were paying between US\$ 0.30 and US\$ 0.46 for an hour of computer/Internet use, and 34% were paying US\$ 0.30 or less.

⁹ A total of 417 SMEs were surveyed; 85% of which used the computer in their business activities. Cities covered: Medan, Lampung, Jakarta, Bandung, Yogyakarta, Surabaya, Denpasar and Makassar.

64. Perú's *cabinas* are ubiquitous and useful to everyone, but particularly important to low income people. In May-June 2004, the proportion of Lima's population aged 8-70 using the Internet regularly (at least once a month) was 41 percent, and the proportion in the 12-50 age group was 54 percent. [Apoyo 2004]. For the age 8-70 group, Internet use is much higher in the upper (84% for "A" socioeconomic status) than the lower income brackets (37% for "D" and 30% for "E" status); and higher for men (54%) than for women (42%). Most of Lima's Internet users – 88% of those aged 8-70 – connect to the Internet through *cabinas*. But whereas *cabina* use is a matter of convenience for the higher income groups, for low income people they often represent the only access option. Ninety three percent of low income users (D and E) use *cabinas* as their habitual place to connect to the Internet (Table 3.4).

Table 3.4. Use of the Internet by Lima's Regular Internet Users Aged 8-70: Habitual Place and Places of Use by Socioeconomic Status - 2004 (%)

Habitual Place of Use				
<i>Location</i>	Socioeconomic Status (A highest; E lowest)			
	A	B	C	D/E
<i>Cabina pública</i>	22	56	82	93
Workplace	19	16	7	3
School	4	5	5	2
Home	52	21	4	-
House of friend or relative	2	2	2	2
Places where Lima residents Use the Internet*				
<i>Location</i>	Socioeconomic Status (A highest; E lowest)			
	A	B	C	D/E
<i>Cabina pública</i>	39	78	92	98
Workplace	33	23	11	4
School	16	12	11	7
Home	68	31	7	1
House of friend or relative	11	12	7	4

Source: Apoyo [2004].

*User's generally connect to the Internet from more than one location.

65. In Indonesia, the importance of telecenters for low income people is not well documented, but may be appreciated from Suriadinata's [2001] finding that 40% of small SME Exporters (with an annual turnover of less than US\$ 21,200) used Warnets, compared to less than 10% for larger SME exporters (with annual turnover surpassing one million US\$). Most of Peru's *cabina* users are quite satisfied with the service they receive. Asked to identify favourable and unfavourable attributes of *cabinas*, those who cite favourable features generally outdo the unfavourable.(Table 3.5)

Table 3.5. Peruvian User Perception of Favorable and Unfavorable Attributes of *Cabinas*

Attribute	% survey users who mention this attribute as:	
	Favorable	Unfavorable
Service	30	8
Privacy	24	18
Location	24	4
Internet Browsing	24	12
Infrastructure	20	18
Price	20	3
Equipment	18	14

Source: Apoyo [2004]

66. The favorable user experience observed in Peru contrasts sharply with their Indonesian Warnet counterparts. Poor quality of Internet connectivity is often cited as a factor limiting Internet use by Yogyakarta users (Table 3.6). When asked what is their main frustration using the Internet, a full 75% of Warnet users cited connection quality problems.¹⁰ Many Warnets have had to close on account of the poor service that they can provide (See Annex 3).

Table 3.6 Principal Rankings by Yogyakarta Warnet Users of Possible Factors Limiting their Use of the Internet

Factor	Users Ranking Factor as 1 st or 2 nd Limiting Factor	
	Number of Users	% of Valid Responses
Cost	156	58.2
Internet Access Speed	150	56.0
Availability of Spare Time	135	50.4
Useful Information or Services	58	21.6
Personal Skills	31	11.6
Other	3	1.1
Number of Valid Responses	268	

Source: Data from survey carried out by Kristiansen, Futurholt, and Wahid, 2005.

67. The type and quality of service is very important to achieving a high social impact. In Perú, *Internet telephony (VoIP)* is provided in the country's *cabinas*, and it is highly prized by low income users (Table 3.7). In Indonesia, commercial provision of VoIP by the country's Warnets is severely constrained by the regulatory regime. Some countries see VoIP as an innovative technology that increases competition in the telecommunications sector and use this feature as a way to lower costs and increase consumer surplus. This is for example the case of the US's minimal regulation approach (<http://www.fcc.gov/voip/>), requiring only basic service provision such as that VoIP phones are able to connect to the national 911 emergency number. Indonesia has adopted a different, arguably more gradual approach to competition (Clarke [2002]), essentially protecting the revenues of the incumbent operators. An estimated 120 ISPs were providing VoIP service in 2000 (Sulaiman [2003]), but in 2001 the Government started regulating the number of VoIP operators and "many ISP who had such their VoIP facility equipment confiscated and directors were arrested in 2002. At the same time 5 VoIP operators were given their one-step dialling licenses and only 12 operators obtained their two-step dialling licenses. (Sulemain [2003], page 21). Any other ISPs wanting to provide VoIP service are required to do so

¹⁰ *Akses Lambat, lama, disconnect and hang.*

through the few licensed operators (Roes Setiyadi [2003]), and additional licenses are issued sparingly (Sulemain [2003]). As of September 2004, there were only 7 VoIP licensed operators.

68. Under the World Bank-assisted Information Infrastructure Development Project (IIDP), a pilot in cooperation with the Indonesian Wartel Association (APWI), with a joint financing scheme of 25% from the Wartels and 75% from the Government of Indonesia. At end of the project the VoIP equipment was installed in 200 Wartels as targeted in Jakarta, Bandung, Semarang, Surabaya and Cikarang. However the pilot project was hindered by technical and non-technical issues. The former was addressed during implementation, such as the unforeseen need for the VoIP equipment to interact with the Wartel billing system.

69. The main non-technical issue concerned the fact that the Wartels were threatened to have their PSTN lines disconnected by PT Telkom if revenue to PT Telkom dropped significantly. Nonetheless, the review of the pilot conducted by the TATP Management Contractor encouragingly showed that the Wartels overall income generated from domestic long distance calls and international long distance calls increased by 17% and 43% respectively.

Table 3.7 % of Perú's Cabina Users who Talk on the Phone through the Internet, by Socioeconomic Status

	% of Users
Status A (highest)	33
Status B	29
Status C	29
Status D/E (lowest)	40
All Users	33

Source: Apoyo [2005]

The Rural Challenge

70. Success in rural telecenter development requires achieving sustainability in low-income high cost rural settings, and on the adoption a new technology and new skills by a significant number of rural people in the vicinity of the center. These conditions preclude private sector investment in the short term. State action is required; even though the State can be very ineffective. 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, for the benefit of consumers.

71. Figure 1 shows a tele-center profit's as a function of urbanization and other factors (x_1, x_2, \dots, x_n) such as say degree of good governance, enabling environment for SMEs, etc. 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 use a tele-center located far from home or their workplace. In Perú, for example, 82% of cabina users walk to the *cabinas*, compared to 13% who drive or use public transport to reach them. The higher the density the easier it is to attract a steady clientele to fill the workstations.

72. The establishment of telecenters in very small villages is difficult, on account of high cost of the infrastructure and its maintenance, but also of low population density (long distances to the

center) and the resultant limited market. At present stage of ICT development in Indonesia, ICT access points most likely to become sustainable in the short term are those in medium size towns with a market potential.

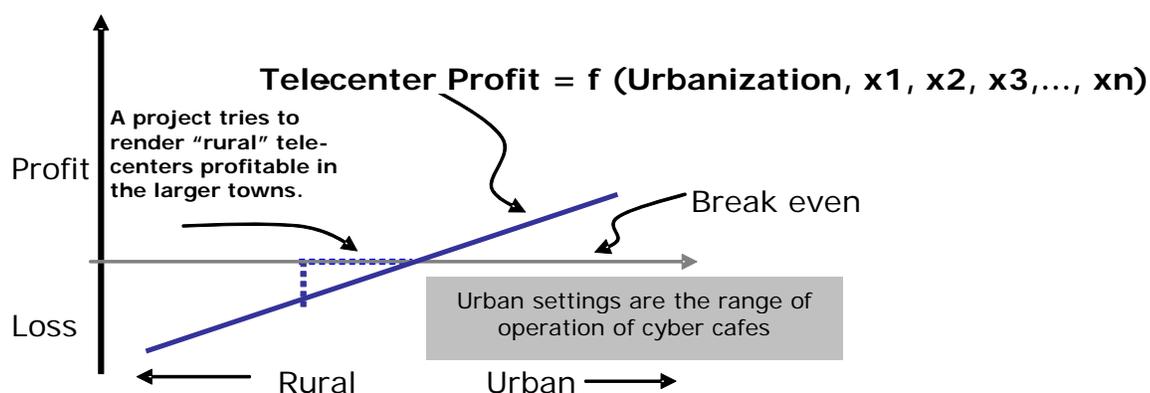


Figure 1

73. Some remote rural areas may need to be served for political and regional equity reasons. Serving these remote areas will be costly. The costs of expanding telecommunications services may best be reduced through careful design of subsidy contests that further encourage country-wide facilities-based competition and the establishment of new entrants in the telecom market. These contests may include the establishment of telecenters along with the expansion of telecommunications service network. Experience in other countries suggests that wireless solutions (e.g. VSAT) are likely to win subsidy contests whenever they aim to serve low-income remote rural communities. **Except for remote areas specifically chosen for political reasons, economic considerations recommend a focus that begins by expanding telecommunications services and establishing commercial telecenters in the larger underserved towns.** The recent deregulation of the 2.4 GHz band for Internet service Gunadi [2005] opens up the possibility that small wireless operators can establish their local network at low cost. Local Government support could play a significant role in helping finance the necessary expansion in rural connectivity. It is thus a welcome development, **provided that it also enables operators using the unregulated band to also provide VoIP service on a commercial basis and that it is accompanied by a significant expansion in the number of operators licensed to provide Wireless telecommunication services.** Some determinants of telecenter profits may be influenced by Government action but others cannot (Table 3.8). Government cannot change a town's population density. Government also cannot improve community income overnight or otherwise affect a community's ability to pay for tele-center services in the short term.

Table 3.8. Key Determinants of Tele-center Profits, Effect of Urbanization and Project Target Variables

	Urban	Rural	
<i>Cost</i>			
Connectivity	Low	High	Yes – promotion of competition in telecommunications sector
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 funding of digital literacy training and providing valuable public services online.

74. But one important measure that Government can implement to lower rural connectivity costs, is to promote competition and encourage new entrants in the telecommunications sector. For remote areas with limited infrastructure the establishment of grant funding using minimum subsidy competitive awards could encourage the needed investments. (See also Annex 2) If properly designed, these competitions will encourage new telecommunications entrants to build the infrastructure needed and increase competition and downward pressure on prices. On the revenue side, Government can fund programs that increase the rural resident’s willingness to pay for services by increasing digital literacy and providing valuable public services online. Digital literacy is a low cost intervention in Indonesia, given the significant levels of basic literacy and educational levels of the population.

Myths and Misperceptions

75. It is commonly believed that the rural poor cannot afford to pay for telecenter services. Operating in about 2,400 kiosks in Southern India in an area with an average per capita income of around US\$ 20/month, n-Logue Communications is showing that where services offer **practical value** people are willing to pay for them (Table 3.9).

Table 3.9. Rate List for Chiraag Kiosk Services (n-Logue, Madras)

No	Name of Product/Service	Unit	Price (US\$)
Education			
1	Blue Certified Computer Course (6 – 9 yrs)	Per student	1.72
1	Blue Plus (6 - 9 yrs advanced)	Per student	5.74
2	Green Certified Computer Course (10 – 16 yrs)	Per student	2.30
3	Red Certified Computer Course (17 & Above)	Per student	6.89
4	Spoken English	Per student/month	5.74
5	Online Test and Tutorial for Class 10	Per student/month	0.69
6	Chiraag Children's Center	Per Student for 2 weekdays, Sat & Sun	0.23
Careers			
1	Chiraag Resume-maker	2 sets of printouts	1.15
Chiraag Studio			
1	Color Passport Size photographs	Set of 5 Nos	0.46
		1 Photo	0.11
2	ID card with lamination – single	1 no.	0.34
3	ID card with lamination – bulk order	1 no.	0.28
4	Visiting card	1 no.	0.28
Browsing			
1		1-15 Minutes	0.23
2		16-30 Minutes	0.34
3		31-60 Minutes	0.57
Email			
1	Email – text	1 mail	0.23
2	Video Mail	1 mail	0.34
Queries to Experts - email or Video-conferencing			
1	To government officials	Per Query or Session	0.23
2	Health		
3	Agriculture		
4	Veterinary		
Astro-Vision			
1	Lifesign Full Horoscope	40 pages	4.13
2	Lifesign Horoscope with predictions	25 pages	2.99
3	Lifesign Basic Horoscope (charts)	16 pages	1.84
4	Lifesign Single Page report	1 page	0.57
5	Horoscope Matching (Porutham)	40 pages	0.69
6	Numerology	8 pages	1.38
Matrimonial			
1	Entering profile	Per profile	1.15
2	Viewing Profiles	As per time used	

Source: Courtesy of n-Logue Communications; www.n-logue.co.in

76. Another common misperception is that the rural poor are too concerned with fulfilling their basic needs to « waste » money on nonessential goods like ICT services. As Prahlad and Hammond (2002) point out, in the Bombay slum of Dharavi, 85% of households own a TV, 75% own a pressure cooker, and 21% have telephones because buying a house in Bombay for most of the poor is not a realistic option and neither is getting access to running water. They accept that reality, and rather than saving for a rainy day, opt to spend their incomes on items that can improve the quality of their lives.

77. Yet another commonly held misperception is that rural people, especially women cannot use such advanced technologies due to illiteracy, and socio-cultural barriers. On the contrary, poor rural women in Bangladesh have had no difficulty using GSM cell phones, despite never before using phones of any type. Poor farmers in El Salvador use telecenters to negotiate the sale of their crops over the internet. And women in the coastal villages of Southern India have in less than a week learned to use PCs to interpret real-time satellite images showing concentrations of schools of fish in the Arabian Sea so they can direct their husbands to the best fishing areas. Clearly, poor communities are ready to adopt new technologies that demonstrably improve their economic opportunities and the quality of their lives (Prahlad and Hammond, 2002).

Rural Telecenters: The Governance Challenge

78. Many countries sponsor rural telecenter development projects to try to bring the potential benefits of telecenters to low income rural communities.¹¹ Telecenters, however, are highly visible and, in a rural village, a prominent “sign of progress”. Every politician wants to be associated with progress. Unfortunately, political interest in a telecenter wanes shortly after inauguration. As a result, the process of telecenter program design is affected by considerations that ultimately undermine sustainability and impact (Table 3.10), and the process of telecenter establishment becomes politicized and lacking transparency.

79. Where governments can afford to fund operating costs, library programs offering connectivity and computer services free of charge (e.g. in Chile (www.biblioredes.cl), Australia, and the US), can have a significant social impact in rural communities. The Korean Government also sponsors a major telecenter program, free of charge, as part of its overall digital literacy agenda (Cho [2004]). In low income developing countries, however, the financial expenditures needed to maintain the centers often become unbearable for continuous state support; e.g. Argentina (Proenza [2003a]) and Paraguay.

80. The more successful programs rely on management that is private or separate from Government. Entrepreneurial examples include e-Chopal (<http://www.echoupal.com/default.asp>; Annamalai and Rao [2003]) and the n-Logue Communication projects (www.n-logue.com; Jhunjhunwala, Narasimhan and Ramachandran [2004]), both in India; and the Public Computer and Communication Center (PC3) Project in mid-sized towns in Bulgaria (Tiff [2002]). The Hungarian telecottages, run by NGOs are mostly located in local government premises, but are operated independently from Government and also appear to be high impact and sustainable.

¹¹ See examples in Badshad, Khan and Garrido [2004] for Asia, and, for South America, in IADB [2004]).

Table 3.10. Stylized Comparison of Private vs Public Sector Telecenter Approaches

Private Sector	Tendency of Public Programs	
Careful establishment – risks are taken only when entrepreneur is ready, after a thorough assessment of market potential and costs.	Fast rollout. The more and the faster the better. Inauguration takes precedence over prudence and sustainability.	Higher risk
Located close to the market: next to tourists, or where young people and students are found.	Tendency to go for blanket subsidies in the poorest areas ; instead of addressing the poverty problem gradually (e.g. commencing with larger towns).	Higher Costs
Continuous monitoring of market trends, client needs, market prices and constant search for new customers and new opportunities for profitable service.	Little monitoring. After inauguration, having the telecenter as a showcase is more important than whether it is used or not. Impact tends to be secondary consideration.	Lower service revenues Lower impact
Careful pricing, discriminatory pricing: to increase revenue and profits.	Free services or excess subsidies , in the name of equity but to the detriment of sustainability (e.g. instead of charging high income customers and only subsidizing the poor on a selective basis).	Lower service revenues
Minimum staffing: use of family or low salary attendants.	Overstaffing is common; and so is tendency to use overqualified staff.	Higher costs
Minimum training; only bare minimum required.	Excess training in many fields, with little regard for cost or affordability.	Higher costs
Services provided are only those that the market will bear. Low cost premises and minimum equipment.	Expensive equipment and furnishings and multiple services , well beyond market requirements.	Higher costs
Pirated software is commonplace. Otherwise open source or low cost software (e.g. Open Office) is used.	Chosen solutions are costly, and tend to mirror those with which public servants are familiar - irrespective of cost or societal implications. They lock-in the country into using high cost proprietary technology.	Higher costs

81. Recommendations

- R1** The single most important action that Government can take to promote rural access to ICTs is to promote an expansion in infrastructure, an improvement in the quality of services and lower rural connectivity costs, by fostering facilities-based competition in the country's telecommunications sector.

R2 Telecenter development is a **potentially powerful** way of expanding ICTs to rural areas, but it is also a **high risk** undertaking. Should the Government decide to support a telecenter development program, it should consider:

- i. starting in mid size towns that offer the greatest prospects of sustainability over the short term but that are presently not being served by the private sector;
- ii. to avoid undermining private initiative, including as prior condition to the establishment of any new telecenter, certification that there is no Warnet present within a radius of 2 km;
- iii. applying smart subsidies (see A. ?) that in essence outsource establishment and management of telecenters to private entrepreneurs.

e-Government at the Service of the Rural Poor

82. Indonesia's present offer of content and services by the Government via the web is poor (Table 3.11), especially considering its potential. Indonesia's rank of 70 in terms of governmental Web presence is lower than for most other Asian countries except for Bhutan, Bangladesh and Sri Lanka. This low ranking does not make sense for a national government serving a large country that has a unified language and high rates of literacy and education rates. Indonesia is thus ranked 12th out of a total of 56 possible stages of the UN's human capital index.

**Table 3.11. e-Government and Human Capital Indicators:
Asia and Selected Countries¹²**

Country	Population 000 000 (2003)	GDP per capita (2002)	Web Measure Ranking	Human Capital Ranking
			2004	
South Asia				
Bangladesh	135.1	352	147	2
Bhutan	0.7	734	165	3
India	1,056.90	494	30	12
Maldives	0.3	2,258	89	17
Nepal	23.7	237	66	22
Pakistan	149.6	428	49	24
Sri Lanka	19.2	863	81	44
Other Asia – Pacific				
Australia	19.9	20,23	8	1
China	1,256.90	963	54	6
Indonesia	215.1	860	70	12
Korea (Rep.)	48.4	10,014	4	31
Malaysia	25.2	3,870	46	17
Singapore	4.2	20,894	3	41
Thailand	62.5	2,044	39	50
Other				
Brazil	176	2,603	24	4
Canada	31.7	23,417	7	6
Chile	14.7	4,413	6	6
Estonia	1.3	4,732	17	10
Ireland	4	31,041	21	13
Germany	82.5	24,122	10	11
USA	292.3	36,223	1	100
UK	58.1	26,369	2	55
Sweden	9	26,864	13	48

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

Web Measure ranking is based on UN [2004] data and covers 177 countries.

Human capital ranking is based on UN [2004] data and 169 countries, but many countries are ranked in the same group the total number of "ranks" is 56.

¹² The UN [2004] report does not calculate the ranks presented in this table. Instead, it estimates a Web Measure Index, a Human Capital Index and a Telecom index in order to derive a composite e-Government readiness index which is estimated by assigning 1/3 weight to each of the 3 indices noted. In this report we have used the index valued estimated to rank countries, according to Web measure or Human capital potential. In the case of the Web Measure ranking it lets countries appreciate how they fare when compared to other countries with respect to the offer of public services by their national governments via the Web. In the case of the Human Capital index, the ranking shows the potential for ICT development, in general, and, in particular, for the potential impact of developing and using public content and services through the web. The UN [2004] estimates the Web presence indexes through a careful analysis of national country portals. Its Human Capital index is based on a composite of 3 index made up of adult literacy, and a combined primary, secondary and tertiary gross enrolment ratio. For additional details, see UN [2004], especially pages 163-165.

83. Indonesia's past successes in reducing poverty through pro-poor growth relied on a combination of sound macroeconomic management and the reduction of transaction costs through investments in physical and social infrastructure. (Timmer [2004]). ICT development can play an important role in a renewed national strategy of pro-poor growth. The proposals below focus on government use of ICTs to serve the poor, and, in the process, stimulate innovation and invigorate national markets so that these work more effectively and competitively at lower transaction costs.

84. The generally low levels of access to infrastructure typical of developing countries hold back governmental offers of content and services online. Since there is no effective demand, there is little value in supplying these services. Where telecenters are ubiquitous, however, the potential for serving the poor through online services can be realized. Telecenter sustainability is also enhanced, as the value of connectivity increases and low income users become more willing and able to connect to the Internet. The relatively large number of Warnets in Indonesia's urban centers, appears sufficiently large to justify starting a program of online service specifically directed at the poor, even if for the time being the urban poor and low middle class will be the principal beneficiaries.

85. This report presents some proposals that can have a significant impact on the poor, at least over the long term, as connectivity in rural areas expands. The institutional feasibility of these proposals is varied. All require leadership, the development of specialized applications, and continuous upkeep. The majority are medium to low-level in institutional complexity. Applications requiring significant changes in the law, customs or administrative procedures have been avoided, even if they might hold considerable future promise (e.g. land records online). The recommendations made have been crafted so that the immediate implementation steps do not involve complicated changes in administrative procedures. Where possible, the practical considerations that made their adoption feasible in other developing countries are outlined. By facilitating management and by giving support to local initiatives, most of the proposals recommended will help further communications, national integration and good decentralized governance.

Agricultural Marketing

86. Due to network effects online market participants tend to cluster in a few online market sites. These select few online markets are successful, profitable and very prominent in the press. In practice, however, most online e-hubs provide information that can be used to identify other traders but very few engage in the facilitation or actual completion of transactions (Paré [2001], [2002]). The amount of new business that is being transacted through these sites is limited (Humphreys *et al* [2003]). e-commerce in Indonesia is barely starting. Some of the obstacles preventing a more rapid expansion include: limited access infrastructure, lack of awareness of the Internet as a business tool, and fear of insecurity of transactions and lack of trust in other market participants (Boerhanoeddin [2002]). But as in many other emerging markets, it is likely that factors other than ICT per se affect the spread of e-commerce including lack of credit facilities, poor logistic support etc.

87. The more successful Business to Business (B2B) market sites increase their service offerings over time, to facilitate networking, knowledge sharing, business information (e.g. insurance, finance) and the build up of trust among market participants (Ordanini [2003]). The Indonesian Government can stimulate greater use of the Internet to expand trade in agricultural commodities and reduce transaction costs provided close attention is paid to the special requirements of agricultural value chains (Tregurtha and Vink [2003] and Humphrey [2002]) and the express needs of market participants.

Target Population and Access to ICTs

88. The ultimate beneficiaries are farmers, agro-entrepreneurs (including agro-processors, traders, exporters and foreign buyers) and consumers of agricultural products. The target population also includes policy makers and research and extension workers.

89. Very few farmers have access to telephones, although a small number are beginning to use mobile phones. It is mainly the larger commercial farm enterprises who have access to telephones, computers and the Internet. There are nevertheless some promising efforts, in Indonesia (Sugandi [2005]) and elsewhere (e.g. in Sri Lanka¹³) to increase the transparency and exchange of information on market prices and thus lower trader margins.

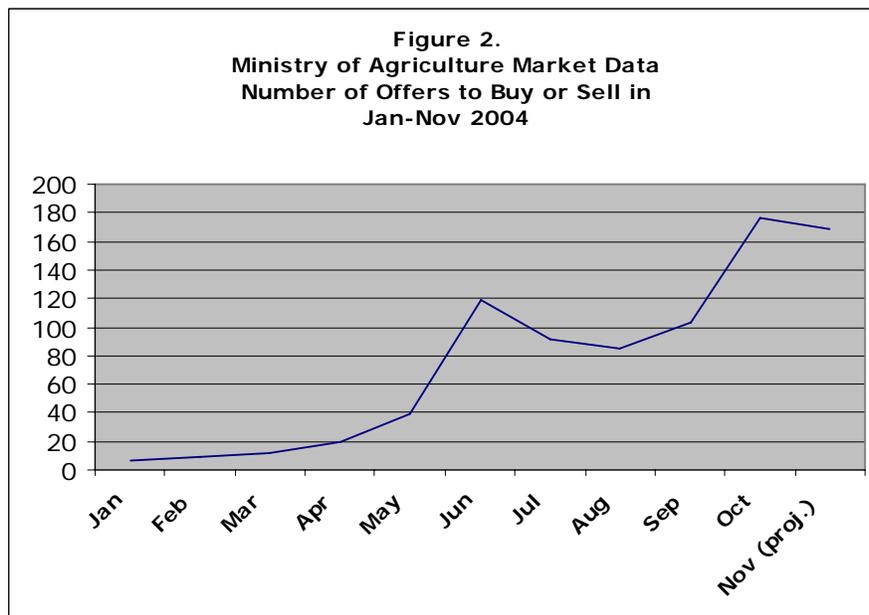
90. Give the limited access to modern ICTs, online services provided by Government will need to start, primarily (albeit not exclusively) to meet the requirements of those members of the target population who presently have access to ICTs; i.e. agro-entrepreneurs.

Services

91. Price and market information is generally gathered locally by farmers themselves and by research and support staff. This is most often broadcast using private radios (where budgetary constraints allow) or using the national public radio station. An Information System of Processing and Marketing of Agricultural Products (SINGOSARI; in <http://agribisnis.go.id>) to disseminate price information through the web has been developed by the Ministry, and the methods for collecting and posting the data through the system are being developed.

92. The Ministry of Agriculture has also instituted a Market Online service, which appears prominently in its website (<http://agribisnis.deptan.go.id/FORUM/default.asp>). The service enables the posting of offers to buy and sell products. The service is not moderated and users need not register with the site in order to make a posting. The site shows the most recent postings. Replies to individual postings may be made directly through a simple form available in the site, or through other means (e.g. email and telephone). The number of postings has increased rapidly during the system's first year of operation (Figure 2).

¹³ A project funded by Sri Lanka's Information and Communications Technology Agency 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. The project is considering an expansion to make the information available to farmers by telephone.



93. To get a notion of the extent to which these postings are facilitating trade a sample of 860 postings made in 2004 were examined. The range of products referenced is very broad, about 250 different products. Most of the postings were offers to sell (77%) as opposed to offers to buy (23%). But only a few products, 5 in all, were referenced in more than 20 postings (Table C.12); and only 18 persons or enterprises posted more than once at least one month apart. In sum, although the system is generating some traffic, this could simply be the result of the large size of the market. There is little evidence that much trade is actually taking place between the system's participants. This finding is not surprising. The same occurs with similar systems elsewhere – e.g. Nicaragua's online market and Chile's Redsercotec online business rounds.¹⁴

94. Indonesia's Ministry of Agriculture's Market Online system has two advantages that make it deserve further experimentation and development. First, although there are some online trading services in Indonesia¹⁵, there are no major alternative online marketplaces covering agricultural products. Second, online markets are highly susceptible to network effects: the sheer sizes of the market make the system generate traffic that make them appealing to newcomers.

¹⁴ In the case of Nicaragua, interest in the system has subsided after its institution in mid 2003 (Proenza [2004]). In the case of Chile, the system is presently used mainly as tool for training new ICT users in the use of the Internet for online marketing.

¹⁵ For example, www.bekas.com offers free-advertising, and news portals such as www.detik.com allow postings of one or two lines. Some specialized marketplaces, like <http://smsiklan.detik.com> is dedicated to trading in computers and digital equipment.

Table 3.12.
Products Referenced more than 20 times in Market Postings to
Ministry of Agriculture Market Online Service

Product	No. of Postings
Vanilla	125
Red Papua	60
Clove	25
Corn	22
Ginger	21

95. Recommendations

- R3** Given the ongoing rapid expansion of mobile telephones throughout the population, in order to expand the reach of the Singosari system under development, the dissemination of price information through SMS messages sent to registered mobile telephone users is recommended.
- R4** Further experimentation with the Ministry of Agriculture’s Market Online service is recommended. Some additional features that deserve consideration are:
- i. To facilitate the development of specialized markets by product, users should be enabled to view and make their postings in separate sections by product. This will prevent users from getting lost in a jungle of postings, most of which are of little interest to them. The list of commonly referenced products in Table 13 could be a point of departure, with an additional category for “other” products. As postings for other product categories become common, additional separate categories could be added.
 - ii. The posting of offers to buy or sell using SMS messages should be enabled. The system would allow **registered** users to make their postings via SMS and to receive notices of new postings concerning specific product categories of interest to them.
- R5** ICTs make it easy and low-cost to monitor impact and effectiveness. Further experimentation and development with Singosari and the Online Market system, should go hand in hand with user registration and user monitoring and feedback, including periodic surveys of user satisfaction.

Agricultural Research and Extension

96. The broad-based growth in rural productivity that is an essential ingredient to rural poverty alleviation need solid systems for generating, adapting and disseminating technology relevant to small-scale producers. Solid agricultural research and extension systems will be critical to get productivity onto a higher growth path. Indonesia's agricultural research system consists of national commodity research centers and sub-national adaptation institutes. However, Indonesian agricultural research expenditures have declined dramatically since the early 1990s compared to its neighbors. Real expenditure on public agricultural research in 2001 was no greater than in the 1995; and presently, it ranks near the bottom as compared to other Asian countries in agricultural research spending, relative to agricultural GDP and total government expenditure on agriculture. Indonesia provides less than 0.1% of agricultural GDP to support agricultural research in the country (less than even Bangladesh, and well below the recommended level of 1 percent).

97. Like public extension systems in many countries, Indonesia faces a major challenge to develop an effective institutional mechanism for disseminating technology relevant for small scale producers. While there is less experience in new models of agricultural advisory services, there is growing evidence of significant benefits to decentralized extension systems that involve the private sector and civil society. A series of positive debates and experimentation in management have taken place. These have included a shift from top-down to participatory approaches, input and technology dissemination to dissemination of market and upstream information and technology, from centrally managed extension services to decentralized services, and some movement toward privatization of extension. In all of these initiatives, measures are needed which better link agricultural research and extension; the separation of these functions within the organization of the MOA (between AARD and AAHRD) has militated against both ensuring focus on farmer's problems while setting the research agenda, and effective dissemination of research results. ICT could be one potential means through which these linkages might be improved. The proposed Farmer Empowerment through Agricultural Technology and Information (FEATI) Project, which the MOA is developing with Bank support, responds to the above set of issues, and will aim to revitalize agricultural research and extension, and in doing so, strengthen the link between agribusiness, technology, information and the farming community.

Target Population and Access to ICTs

98. The target beneficiaries are farmers and agro-entrepreneurs. Given present access limitations - including not only lack of access to the equipment, but also familiarity, skill and comfort in its use - Research and Extension workers will remain, in the coming years, the main knowledge brokers - purveyors of agriculture related technical knowledge and information.

99. In general, agricultural research staff have access to ICTs. Perhaps a large majority use mobile or land phones, and in each research/extension center there is a small cadre of researchers familiar with the use of computers and the Internet. Regularity of use of the Internet by Research/Extension staff within the BPPT system (Agency for the Assessment and Application of Technology, Ministry of Research and Technology) is constrained by the high costs of connectivity, and depends on local budgetary allocations; e.g. in Magelang's Office of Agriculture and Forestry Information, it is rationed to use by 4 persons and 3-5 hours a week, out of a total of 34 professionals supporting the work of 140 field staff. Access to ICTs by the country's approximately 33,000 extension workers, who are presently dependent on local district governments, is negligible.

Services

100. The Ministry of Agriculture has two main systems providing agriculture related technical knowledge and information.

i. The site of the Institute of Agriculture Research and Development IARD.online (www.litbang.deptan.go.id), which includes information on the staff, resources, news and events of interest to staff, and gives an ordered listing of the main technological packages (http://www.litbang.deptan.go.id/hasil_penelitian);

ii. The site of the Scientific Technical Information System (STI), administered by the Indonesian Center for Agricultural Library and Technology Dissemination (<http://pustaka.bogor.net>), includes an extensive and well catalogued set of library references to journal materials and other technical documentation.

101. Considerable work has gone into putting online an extensive set of materials in both of these sites. Nevertheless, few of these materials are directly downloadable by users. Online access to simple instructions and information, of the type that might be published in a brochure for immediate practical use by farmers or extension workers, is not readily available. The Ministry plans to address this shortcoming through the recently launched “Poor Farmers’ Income Improvement through Innovation Project.” The classification of research and technical information and the listing of researchers in these two sites facilitates networking. In practice, many research and extension workers, and even some progressive and commercial farmers, use e-mail to interact with colleagues and Ministry of Agriculture experts and discuss specific technical queries. There appears to be no monitoring of the extent to which the various parts of these two sites are used in practice. The Department of Agriculture has also established an interactive space in its main website with a forum, where users may post their technical queries, to be answered by any other user. A quick review suggests that this forum is used only very occasionally, and most questions remain unanswered. In addition to the research results of the BTPs, there also exist other good sources of content for the farming community such as the NGO, Bina Swadaya’s *Trubus* magazine, some input suppliers but there seems to be no interest or effort in adapting this for internet access.

102. Several countries have begun to use online means of providing direct answers to farmers and extension workers; e.g. Chile’s Advice Online service (www.redsercotec.cl; Annex 3), Sri Lanka’s Cyber Extension Project (www.gov.lk/Agriculture/Agridept/NEWS/News.htm), UAE’s “Ask Advisor” service (www.uae.gov.ae/uaeagricent/AskQ/ask_main_eng.htm), which is using the Chilean system as reference. India’s n-logue Communications Query to experts service (Box C.1).

103. A system of this nature is particularly suitable for a diverse large archipelago country like Indonesia, and would be consistent with the recent decentralization efforts while reinforcing national integration. Unlike other kinds of e-government services, no major re-engineering of procedures would be necessary; but success will require political determination to institute the system and to encourage staff participation.

Box 3.1.

n-Logue Communications (www.n-logue.com) is a Company founded by the Indian Institute of Technology - Madras. The company operates on the principle that serving the rural poor through information and communication technologies can be profitable. A three tier franchise system is used to provide services for a fee to the rural poor. The applications used to serve its rural clientele are developed at IIT Madras, but then spun into companies. To date, an estimated total of 2,400 kiosks are operated by the franchise. Because India is a land of many languages, a purely text based system of advice online would be impractical. Instead, n-logue's provision of technical advice using ICTs uses a low bandwidth videoconferencing application developed by IIT Madras and commercialized by another company (<http://www.oops-india.com/>), as well as through the exchange of highly compacted video clips.



104. Recommendations

- R6** The establishment of an Advice Online system is recommended. Its implementation has been accepted in principle by the Ministry of Agriculture. The system could start on a trial basis by facilitating the answering of queries and networking between the large number of researchers and extension workers.
- R7** ICTs make it easy and low-cost to monitor impact and effectiveness. The monitoring of the extent to which different parts of Ministry of Agriculture websites is recommended as a cost effective means of identifying which parts of the site are valued by users and which are not. Periodic follow-up surveys of users can also help identify means of improving the Ministry's online services.

Rural Education

105. Indonesia's population of school-age children is one of the largest in the world. A sustained drive to build schools across the country since the 1970s has resulted in more and more of those children attending school every year. However, behind the impressive increase in enrollment at the national level, wide regional differences remain, between provinces and within districts especially urban-rural disparities. Since the mid-1990s, there has been a trend in Indonesia towards school quality improvement projects that are school-planned, school-based, and school-monitored. This trend is consistent with Education Law 20, which has empowered schools to make decisions regarding their governance and management [World Bank, 2005]. However, the World Bank's Education Sector Review (2005) concludes that there is tremendous variation in the capacity of schools to exercise the authority that decentralization has given them. The review calls for, inter alia, a proposal-based grants program that would allow schools to request extra resources for specific innovations and experiments including include a training facility to help build this capacity in those schools that lack it. ICT-based applications could be one such innovation.

Target Population and Access to ICTs

106. The ultimate target beneficiaries are rural school children, university students, and their parents. It also includes policy makers, school administrators and teachers. Many schools have telephones and computer labs. Universities generally have access to the Internet, but, with some notable exceptions, connectivity is low bandwidth, congested and costly. Very few public schools in Indonesia have Internet connectivity.

Services

107. The Directorate of Technical and Vocational Education (DTVE) of the Ministry of National Education is executing an important program of 'block grants' to qualifying schools to help fund the establishment of ICT Centers which draw wireless connectivity and help connect neighboring (mainly secondary) schools within a district (Priowirjanto [2005]). An estimated 44 such ICT Centers have already been established.

108. Two features of the program are noteworthy.

First, the program relies on local initiative, and involves not only public schools but also qualifying private schools. The Center for ICT Studies in Jakarta (www.ictcenter.net), is part of a private Tourism school. The Center is staffed with a dedicated young cadre of school instructors highly qualified in ICTs who have set up an ISP and are presently serving 17 Warnets within a 30 km radius.

Second, contrary to the norm in many countries, Indonesia's public school system allows public schools to establish "productive activities" to produce goods and services for sale to the public. This helps generate income for the school and, in the case of ICTs, could help enhance the prospect of sustainability. An example is the community Warnet in Magelang's school for Technology and Manufacture, with about 20 computers operated alongside its school lab, which charges Rp 1,500/hour. The practice is accepted practice mainly in the Vocational schools, but could in principle be applicable by other parts of the public school system.

109. The program's implementation difficulties are worth noting, because they will need to be addressed swiftly in order to ensure the success of the program. Out of the 7 schools receiving Internet connectivity from the Magelang school, only about 3 are actually using the service. One of the reasons cited by the Magelang's ICT staff, is that, being new to wireless, school officials find it difficult to achieve the Internet connection. Another contributing factor was observed in Salatiga, where the local franchise of INDOSAT is providing wireless connectivity to 22 schools with no time limit for the use of the service. Apparently only 4 or 5 of these schools are utilizing the service, with the rest locking up the computer that has an Internet connection for "fear of breaking the equipment".

110. An example of a **rural** school access program is the Telecenter in the Islamic School in the village of Pabelan (Mungkid, Magelang) sponsored by Bappenas and UNDP. While this is primarily a poverty-reduction project aimed at a poor community in Pabelan, it is housed in a pesantren and the pesantren's community development wing, BPPM manages the project. The pesantren pays for electricity and the telecenter is housed in the BPPM building. Dial-up connectivity is provided for free to telecenter users, but only for the one year duration of the project. The center was established in April 2004 and spent the first three months providing awareness training to groups of farmers, artisans, etc. School officials report considerable initial enthusiasm, which has since waned. High connectivity costs, relatively long distance to travel from many parts of the village to the center, and a lack of familiarity with the technology by school administrators are likely to undermine the center's sustainability after the project has ended. Further, there is a growing resentment from some members of the community who want their own children to participate in the English-language training which is seen as being dominated by the pesantren and non-Pabelan students (Robinson, 2005).

111. Present public offer of content online directed at enhancing school curricula is sparse. The DTVE website (www.dikmenjur.net) does provide services of interest to school teachers, including a forum for exchange of news of information which represents an interesting way of promoting teacher proficiency in the use of the technology. The Educational Communication and Information Technology Center (Pusat Teknologi Komunikasi dan Informasi Pendidikan, PUSTEKKOM) of the Ministry of National Education has a long trajectory in the use of technology to enhance the quality of teaching, and has begun to offer selected content for elementary, junior high and high school students that are downloadable from their site (www.pustekkom.go.id and from <http://www.e-dukasi.net/>). A few teachers are also using the Internet to reinforce their school curriculum (e.g. in Peasant Association school in Salatiga). Further development and dissemination of educational online content in the Indonesian language is important. Computers at home or in the classroom may be distracting and even detrimental to students, unless put to good use through educational material available in the Internet or educational software (Fuchs and Woessmann [2004]).

112. Four distance e-learning centers sponsored by the World Bank Global Development Learning Network Project, (GDLN [2002]) will soon become operational and suited with state of the art technologies to enable simultaneous videoconferencing nationally, regionally and world wide. The principal center will be located at the University of Indonesia in Salemba campus in Jakarta, and three regional centers will be sited at the Universities of Hasanuddin (in Makassar), Riau (in Pekanbaru) and Udayana (in Denpasar). These centers aim to increase the capacity of public and private decision makers and expand their exposure to global knowledge on modern economics, finance and development management.

113. Unused school and telecenter connectivity is an unfortunate common occurrence in low income countries that are trying to rapidly expand the use of ICTs. One lesson learned from other countries is that the introduction of ICTs requires no less than a "cultural change" at the school

level in order for the technology to be effectively used. It is not enough to train only one or two teachers per school. At least over 60% of the teachers and administrators need to be trained in the use of ICTs at the same time in order to create the attitudinal change that encourages regular use of ICTs by the majority of the staff and generates the necessary cultural shift. A complete ICT development package designed for schools, that combines connectivity with training, and curriculum and content development is required.

114. Recommendations

- R8** A comprehensive operational program that covers all aspects of ICT in education should be incorporated into present activities of the Ministry of Education. This program should include the provision of connectivity combined with support for teacher and administrator training, and the development of curriculum and teaching materials. Proper sequencing of activities need to be planned for to ensure full utilization of the available ICT equipment when installed.
- R9** The development and dissemination of educational content online deserves support to expand the present offerings aimed at students, teachers and parents. This should be part and parcel of the comprehensive program recommended (R8). It will enhance teacher and student experience and simultaneously encourage school administrators and teachers to get a better grasp of the advantages of using ICTs for educational purposes.
- R10** It is recommended that the possibilities of using the four CGIL Centers to support national efforts to produce distance learning materials to service the needs of Indonesia's education sector and to expand digital literacy and service training needs of the poor be reviewed.

Micro, Small and Medium (MSME) Rural Enterprise Development

115. Small and medium enterprises in Indonesia account for an estimated 63% of non oil and gas GDP and 14% to non-oil and gas exports (National Information Agency [2003]). Their contribution is probably higher, if the many small and micro-enterprises in the informal sector are counted (Heriawan [2004]). SMEs are especially important to poverty mitigation. Their significance for Government policy and poverty reduction came to the fore during the 1997 crisis when many corporations failed while the Micro, small and medium enterprise (MSME) sector remained unscathed and in some instances even thrived (Rudjito [2003]).

Target Population and Access to ICTs

116. Considering that the number of micro, small and medium enterprises (SMEs) using the Internet in 2001 represented less than 1% of the total SME population, (Castle Asia [2002]), the number of rural SMEs presently using the Internet is negligible. The proportion of rural SMEs using mobile telephones is probably higher than those using the Internet, but lower than the proportion of mobile users in Indonesia, i.e. 5.5% in 2003 (ITU 2004]).

117. Information on SME use of the Internet is available only for urban SMEs. The Asia Foundation's study of SMEs and e-commerce [2002] gives examples of highly effective uses of the Internet by SMEs in 12 Indonesian cities and identifies three kinds of SMEs: Internet Users, Prospective Users and Traditional Companies. It finds a strong correlation between Internet use and entrepreneurial capability, including educational level and managerial effectiveness, and concludes that those enterprises least prone to use or uninterested in using the Internet are also

those facing critical entrepreneurial shortcomings. SMEs who do connect do so mainly in response to the demands of the market; e.g. buyers who wish to see pictures of their products or who wish to communicate cheaply via email, or SMEs who on their own initiative use the Internet to search for new clients.

Services

118. Present online service offering to SMEs by Indonesian Government websites is limited. Noteworthy is the Ministry of Trade and Tourism site (www.dprin.go.id/Ind/tec.asp), which contains a registry of enterprises with a brief description of each and contact information. The site also enables the posting of business opportunities. The site of the Small and Medium Enterprises and Cooperatives Development Agency (SMECDA; www.smecca.com), gives background information about the agency, statistics on SMEs and Cooperatives, a map showing a list of products for each locality and a list of (formally registered) SMEs in each area, and a links to other sites.

119. To have significant impact on SMEs, the following fundamental problems need to be addressed:

- i. lowering the costs of doing business associated with meeting Government licensing and regulatory requirements (at national, provincial, and local levels);
- ii. increasing the transparency and the information available to SMEs so that they can participate effectively in Government procurement.
- iii. increasing training, information and advice available online directed at the specific requirements of SMEs,

120. The cost of doing business in Indonesia is high, on account of multiple governmental procedures and requirements, and the significant time and expense involved in complying with these. Decentralization has further complicated matters, as new regulations and taxes have been introduced by local and provincial governments. With respect to starting a new business, Indonesia's requirements are more onerous than nearly all other Asian countries (Table C.13).

121. Since 1995 Government has been establishing One Stop Shops where entrepreneurs can in principle meet every Government requirement under one roof. Although a welcome move that has in some instances been quite effective, not all of these attempts have been successful and in some places these one stop shops have even added another layer of red tape (Asia Foundation [2004]).

122. Modern governments make it easier for citizens and businesses to carry out transactions online. The ideal is a single one stop shop **online** for every kind of transaction that a citizen might be involved in (e.g. see Chile's award winning site: www.tramitefacil.cl). Some regional websites have reportedly started to post some forms and allow some transactions to be carried online; but, overall, Indonesia is far from the ideal and the "back office" work that would be required to establish such a far reaching online presence makes the ideal probably out of reach in the short to medium term. Nevertheless, the national government could begin with a simple program that rewards local and provincial governments that enable and effectively implement the simplification of business transactions using in part an online system.

123. Peru's extensive telecenter network is making it possible for the Government to support SMEs through online services. Peru's proactive approach is low cost and does not introduce distortions in market signals nor compromise the quality of products purchased. Instead the

system makes effective use of the Internet, to help overcome the information barriers that traditionally prevented small enterprises from taking advantage of the enormous purchasing power of the State.

Table 3.13. Starting a Business in East Asia and the Pacific, 2004

Country	No. of procedures	Time (days)	Cost (% of income per capita)	Min. capital (% of income per capita)	Economy Characteristics		
					GNI per Capita (US\$)	Informal Economy (% GNI, 2003)	Population (millions)
Cambodia	11	94	480.1	394	310	..	13.4
China	12	41	14.5	1,104	1,100	13.1	1,288.40
Fiji	5	34	2.5	0	2,360	..	0.8
Hong Kong, China	5	11	3.4	0	25,430	16.6	6.8
Indonesia	12	151	130.7	126	810	19.4	214.5
Lao PDR	9	198	18.5	29	320	..	5.7
Malaysia	9	30	25.1	0	3,780	31.1	24.8
Mongolia	8	20	8.1	182	480	18.4	2.5
Papua New Guinea	8	56	30.7	0	510	..	5.5
Philippines	11	50	19.5	2	1,080	43.4	81.5
Singapore	7	8	1.2	0	21,230	13.1	4.3
Solomon Islands	5	35	43.6	0	600	..	0.5
Taiwan, China	8	48	6.3	225	13,320	19.6	22.6
Thailand	8	33	6.7	0	2,190	52.6	62
Vietnam	11	56	28.6	0	480	15.6	81.3
East Asia & Pacific - Av.	8	51	47.1	100.5			

Source: World Bank [2004]

124. Perú's State Purchases Law which became effective early in 2001 has significantly increased commercial opportunities for Peruvian SMEs employing fewer than 40 workers. The law provides that these small enterprises be favored in the event of a tie in a public tender process, and, more importantly, it requires that every State agency notifies PROMPyme (the government sponsored SME support agency) of those tender processes involving small amounts. Low value purchases matter the most, because those are the kinds of purchases that small enterprises are in a better position to supply competitively. Once PROMPyme receives the calls for proposal, it immediately notifies enterprises. A total of 14,709 users have subscribed to the PROMPyme portal and have asked to receive notices of State purchases from PROMPyme by e-mail. More suggestive, the proportion of central government purchases that were supplied by small enterprises has risen from 23 percent in 2001 to 39 percent in 2004. In 2004, US\$ 756 million of goods and services purchased by State agencies were supplied by small enterprises.¹⁶ A more complete description of Perú's system is given in Annex 3.

125. Indonesia's experience with e-procurement includes:

The establishment of a web based system of information on procurement processes and tenders by the Department of Settlement and Regional Infrastructure (www.kimpraswil.go.id), as part of the country's effort to fight corruption. The service provided is information which may then be acted on by individuals to bid for new tenders, to question bid awards, or to ensure that contracts awarded are actually fulfilled. The intended impact on corruption is considered limited, as is its impact on the poor (Heeks [2003]).

The Information Infrastructure Development Project (IIDP) also tested a set of pilot e-procurement activities in three agencies: the Ministry of Communications and Information (MCI), the Ministry of Research and Technology, and the Ministry of Energy and Mineral Resources. The modules established included e-Tendering, e-purchasing, e-catalogue and Vendor and Agency management systems. An evaluation of the pilot is to be carried out by MCI. A new World Bank funded project, the Government Financial and Revenue Administration Project (GFMRAP; World Bank [2004a]) is expected to take the IIDP pilot experience further; e.g. by expanding it to the Ministry of Finance. According to the IIDP's Implementation Completion Report (World Bank [2004b]) it is too early to tell whether more agencies will join the system.

126. This experience with e-procurement information could be used as starting point to the eventual introduction in the country of a State Purchases from SMEs Program, along the lines of the Peruvian system. SMECDA has engaged technical advisors in several regions of the country to provide technical assistance and advice to SMEs. There appear to be no Government efforts in Indonesia to provide advice or business development services using ICTs. This may have been justifiable, up to now, given low levels of use of the Internet by SMEs. The World Bank's proposed Rural Investment Climate Survey, will, inter alia, examine the importance of information and communication services for the growth and development of non-farm rural enterprises in select kabupaten.

127. Experiences in India (N-Logue, Gyandoot) also demonstrates the power of aggregating demand, making the community – not the individual – the network customer. By facilitating private entrepreneurs to run these kiosks and provide multiple services, these kiosks become economically viable and can scale up unlike other donor-driven interventions. N-Logue for

¹⁶ Valuable resources on e-procurement are available in the Electronic Government Procurement (e-GP) Portal (www.mdb-egp.org/data/default.asp) sponsored by the Multi-lateral Development Banks.

example, is now operational in 31 districts in 2300 villages – kiosks that cost \$1200 to set up and need \$90/month to be viable (Jhunjhunwala, 2005).

128. Recommendations

- R11** A feasibility study geared to finding ways of using ICTs to contribute to a reduction in informational and transaction requirements associated with doing business in Indonesia is recommended. The principal focus of the study should be on requirements that directly affect informal and Rural SMEs.
- R12** The introduction in Indonesia of a program similar to the Peruvian State purchases system is recommended. Such a system would reinforce present Government efforts to fight corruption. It would also increase competition for State purchases, increase the demand for goods and services from the formal SME sector and, by stimulating Internet use through a very practical application, help SMEs lower their overall communications and transaction costs and thus strengthen their competitiveness. Actual implementation of the system would not be technically demanding for participating agencies, but the passage of legislation sanctioning the new system and requiring notification to a centralized agency (e.g. SMECDA) would be indispensable. Given the widespread use of telephony among urban dwellers, notification through SMSs should be contemplated.
- R13** Collaboration between the Ministry of Agriculture and SMECDA is recommended, to work for the establishment of a single entry point for advice online service for SMEs.

e-Government Content Development Processes

Target Population and Access to ICTs

129. The target population of e-Government¹⁷ are ordinary citizens of all walks of life, with a multiplicity of interests. Most Indonesians, especially the rural poor, do not use or have access to modern ICTs. According to ITU [2004, 2004a] only 3.8% of the population used the Internet, 5.5% used mobile phones, and only 1% had computers.

Services

130. Priority for ICT development is presently properly placed on increasing access to ICTs, by Indonesia's low-income population. A parallel expansion in the provision of government services online to serve low income people, will give support to such a policy, by enhancing the economic and social value to ordinary citizens of using ICTs. Such expansion needs to be carefully crafted, so that it goes hand in hand with the development of the market (i.e. so that it does not provide services that no one uses), is cost effective, and makes good use of scarce public resources. To date, e-government in Indonesia appears to have been developed experimentally, based on budgetary availability, with limited interaction or coordination across public agencies. Experience in other countries shows that such approach may lead to failure and a waste of scarce resources.

¹⁷ The term e-Government is often used in reference to a broad range of ICT development activities. Here it refers to the provision of public services through the Internet or the telephone.

131. Recommendations

R14 Some of the “best practice” principles recommended for adoption in Indonesia are:

- i. a citizen oriented approach, under which ministries coordinate closely to avoid duplication of effort and so that a citizen is not required to navigate through a jungle of sector sites in order to get the service that she needs;
- ii. the adoption of nation wide interoperability framework that enables sector ministries to develop their own systems according to their expertise and requirements, but that also follow a set of general standards and guidelines that enable these systems to “talk” to each other and share data¹⁸;
- iii. stepwise gradual developments in e-government services are generally preferred to large mega projects, and the latter, when necessary, should be subject of a rigorous system of peer review involving experts from several ministries, academicians and civil society.¹⁶

Digital Literacy and Community Development

The Human Side of Access

132. As often happens in countries with low digital literacy, the contrast between adults who use ICTs and those who do not are striking. The following situations were encountered during the course of the study:

- A high ranking public official in Jakarta, manager of a nominal staff of over 20,000 people, does not use email, is not familiar with the Internet, and finds little use for computers or the Internet either for either personal or work purposes.
- Computer facilities located in several public schools benefiting from free equipment and connectivity do not use the facilities for fear of breaking it and a perceived high cost of maintenance; or on account of insufficient skills to connect regularly. The equipment remains unused locked up in the administrator’s office. Attempts by the donor to encourage use of the existing facilities is resisted by local and district school officials.
- A local primary school sponsored by a Farmer Leaders’ Organization, equipped with financial support from the Government and enjoying free connectivity thanks to a generous and forward looking local ISP (Box 3.2). Volunteers donate their teaching services to the school, in some instances as a second job. The school is housed in the residence of the Chairman of the Farmer’s Organization. He finances the school maintenance expenses, partly by using the free connectivity to download music, books and documents (e.g. UNDP’s Human Development Report), and then create CDs and books for sale locally. The eyes of the children – boys and girls aged 9-13 - glimmer with joy and hope when they talk about their experience with computers and the Internet, and about their future.

¹⁸ Examples from the UK (Office of the e-Envoy[2004]), Colombia (Agenda [2004]) and Brazil (Governo Brasileiro [2004]) could serve as references.

Box 3.2. Salatiga Alternative School

The SLTP Alternatif Qaryah Thayyibah is an alternative junior school that operates under the open school program of the government. The school is one of the four alternative schools being run by the Farmers Federation, SPP Qaryah Tayibah in Salatiga. The schools are:

Name of School	Address	Number of Student		
		F / Girls	M / Boys	Total
SMP Alternatif Qaryah Thayyibah Kali bening	Kali bening Village, Tingkir, Salatiga	10	15	25
SMP Alternatif Qaryah Thayyibah Candi Laras	Batur Village, Ngelo, Getasan, Semarang	2	3	5
SMP Alternatif Qaryah Thayyibah Otek Makmur	Kendel Village, Kemusu, Boyolali	32	53	85
SMP Alternatif Qaryah Thayyibah Bandongan	Bondongan, Magelang	--	11	11

The students in these alternative schools all live in the communities, most of them are children of farmers. The buildings being used as schools either belongs to the federation or by members of the community. These schools have become popular within the communities due to the high quality of education and teaching provided and lower costs because the kids no longer have to incur travel cost.

A unique feature of the schools is that all are equipped with computers and all have 24 hour connection to the internet. The connection is provided free by a company called Indonet Salatiga, a local ISP owned by entrepreneur and an educator, Mr. Roy Budhianto.

In the Salatiga school, the dedication of the teachers and the enthusiasm of the students were very evident. All the teachers are volunteers who donate their talent and time because they believe in the school's philosophy that derives from the principle of "education for all". The school has been running for two years and their experience in using computers and the internet on a regular basis have positively contributed to the teaching of the teachers as well as the learning of students. The school has four computers which are being used for:

- Finding information relevant to all subjects being taught in the school
- Email communication among the students and between teachers and students. Students send their homework to their teachers
- Meeting other children online
- Learning applications such as word processing
- Learning English

Both girls and boys were equally engaged in all these activities.

The remarkable thing about the school is that all students have refurbished pentium 2 personal computers in their homes. PCs are considered as a necessary educational "equipment" by the head of the school and have made the computers available on three-year loans to the families of the students. Payments of 1,000 rupiah are included in daily expenses for each student.

The head of the school Mr. Bachrudin, believes that they are now seeing the effectiveness of their educational approach, of which the use of ICT is a critical part. For the first time, the students in his school were evaluated by the Department of Education and the results were above the national average.

In contrast to the alternative school, the experience of government run junior high schools in Salatiga have not been as positive. Twenty-two schools benefited from a project implemented by Indonet Salatiga and were equipped with at least one free PC and a similar 24 hour Internet connection. Out of this number only 5 schools have ended up using their PCs and connection. In the rest of the schools, the equipment are kept at the headmaster's offices, off limits to both teachers and students. According to Indonet head, Mr. Roy Budhianto, the main reason for such limitation is the resistance from headmasters who have no experience in using the tools available to them, or who believe that these tools are more appropriate for secondary students. He believes that a mindshift among headmasters about the use of ICTs and the internet has to occur before the full potential of these technologies can be realized in Indonesian schools. Schools have to be offered incentives for integrating ICT tools in their educational programs and services and educators have to be convinced about how ICTs can empower the teaching and learning process.

133. Similar sharp differences between adults who use computers and the Internet and those who do not, also turn up in surveys of SME use of ICTs (Suriadinata [2001], Castle Asia [2002], Brata [2002]). SMEs who use the Internet and computers are generally satisfied with their effect on their businesses. Many of those who do not, find no reason to use it.

134. ICT use is subject to network effects. If only a few friends and associates use the telephone, telephony is of limited value. It is when the network is large that it makes sense to use the telephone, the computer or the Internet. It is when many family and friends may be contacted through the phone or through email that people find a reason to learn how to use the technology. When it comes to computers and the Internet, attaining access by adults often requires overcoming computer anxiety, a phenomenon which affects adults more often than children.

135. Through market forces alone the use of computers and the Internet will eventually reach a critical mass of micro-entrepreneurs and rural poor, and network effects will accelerate the process making it appealing for the majority of the rural and micro-entrepreneurial population to use the technology. The process could take several generations.

136. To reduce the lag time, funding of digital literacy campaigns to train select low-income groups has become part of national efforts to further ICT development and are usually incorporated into broader ICT programs. Digital literacy program stimulate demand, and tend to be self-targeted, as high income people do not generally need ICT training.

137. In Korea, Government carried out mass media informatization campaigns (Park [2001]) and established Education Information Centers in schools and post offices, used to provided free or low cost information education to an estimated 10 million people, mainly students, government staff, soldiers and housewives (Lee [2002]).

138. Chile's national digital literacy campaign (Gobierno de Chile [2004]) provides for digital literacy training of 500,000 people for the 2003-2005 period (www.alfabetizaciondigital.cl, www.mineduc.cl/alfabetizacion/). The program runs in parallel with its telecenter program and includes digital literacy training to users of public library telecenter users (www.biblioredes.cl) as well as specific efforts directed at farmers (Subsecretaria de Agricultura [2004]). Additional details of Chile's program may be found in Annex 3.

139. Some programs go further. The e-Sri Lanka Development Project (World Bank [2004]), provides small grant funding to innovative uses of ICTs that benefit low income communities. A similar program should be considered for Indonesia, on a pilot basis, following a feasibility study of suitably transparent competitive funding mechanisms.

140. Recommendations

R15 Funding of a digital literacy training program deserves consideration, to promote accelerated use of computer and the Internet, especially by government officials, micro-entrepreneurs, farmer leaders and leaders of women development groups and grass roots organizations.

R16 The establishment of a pilot competitive grant fund, to experiment with the implementation of high impact rural poverty reduction initiatives is recommended.

Assessment of Impact and Institutional Feasibility

141. Table 3.14 presents a subjective assessment of the potential effect on the rural poor, sustainability and governance, and of the institutional complexity and risk of failure, of the principal recommendations made in this report. Recommendations R5, R7, R8, R10 and R14 offer guidance based on lessons of experience but are not considered here. Table C.14 focuses instead on recommendations that could result in significant State interventions. The assessment is subjective, and therefore subject to discussion and adjustment.

⇒ ***Impact on the Rural Poor***

142. The single most important action that Government can take to promote rural access to ICTs is the promotion of facilities based competition in the telecommunications sector (**R1**). Only after the telecommunications sector is subjected to vigorous competition, will infrastructure expand, the costs of connectivity in rural areas become lower. Once this occurs, the other recommendations appearing in Table 3.14 will immediately gain in importance in terms of their potential impact on the rural poor. A rural telecenter program could have significant impact on the poor, but only if it is carefully crafted and if the risk of political manipulation can be warded off. Experience in other countries shows that these are two very difficult requirements.

143. Until competition policy breaks the present infrastructure impasse, the impact of any digital literacy campaign will be limited to areas where connectivity is available and relatively low-cost. Presently, only a few rural areas meet these conditions. Nevertheless, the establishment of a digital literacy program directed at key potential users, can have a major effect on the rural poor, especially if run in parallel with a rural telecenter program. Because of widespread lack of access and high cost of access; all other interventions are rated low or medium in terms of their rural impact. The impact on the rural poor of these other interventions is conditional on access to ICTs, and rural access will expand very slowly until Government takes up this major initiative. They are nevertheless recommended here, because they will have considerable impact on low income urban populations and because they represent important first steps to increasing the value of connectivity for low income rural dwellers.

⇒ **Sustainability**

144. The sustainability of the proposals is difficult to assess *a priori*, because the design of the intervention will very much affect sustainability. The qualifications given are an approximation, based on experience in other countries. Where they have been put into practice, once they have been instituted the three programs underlying interventions R1, R6, R12, and R13, have not been difficult to maintain.

⇒ **Impact on Governance**

145. R3, R4 and R9 will have limited (medium) impact on governance. All of the other recommendations proposed will make a significant contribution to the efficiency of the Indonesian Government, and will increase transparency and accountability.

⇒ **Institutional Complexity - Risk of Failure**

146. Introducing the proposed changes will require leadership of high order, and will not always be easy. The adoption of an aggressive pro competition policy for the telecommunications sector (R1) will be extremely difficult. Many powerful agents with diverse interests have very high stakes in keeping the present state of affairs unchanged.

147. The risk of failure on account of political meddling will be high for any telecenter program adopted by Government (R2).

148. The establishment of an advice online system will not be difficult, either for the Ministry of Agriculture (R6) or SMECDA (R13). Interagency coordination, however, is often complicated, even though highly desirable in order to offer the public a unified single entry point for advice online covering a broad range of topics. T

149. The establishment of an information system which advises small entrepreneurs of State tenders of small quantity purchases is not itself complex; but the passage of a law requiring public agencies to inform a central service unit will require the political determination to do so (R12).

150. The establishment of a national digital literacy campaign (R15), and of a pilot competitive grant fund to stimulate community development initiatives that make effective use of ICTs (R16) are also regarded as having a medium level of complexity.

Table 3.14. Potential Impact on Rural Poverty, Sustainability and Governance, and Institutional Feasibility and Risk of Principal Recommendations

Recommendations		Impact on	Potential Sustainability	Impact on	Institutional
R1	Promotion of facilities-based competition in the country's telecom sector.	Very High	High	High	High
R2	Establishment of telecenters in medium size towns, relying on smart subsidies and private sector management.	High	Medium	High	High
R3-R4	Development of Singosari system to include dissemination of price information through SMS messages; and further experimentation with Market Online system.	Medium	Medium	Medium	Low
R6, R12	Establishment of Advice Online System for Ag. producers and SMEs (in general) with a single online entry point.	Low	High	High	Low-Medium
R9	Further development of educational content and services online.	Low	Medium	Medium	Low
R11	Feasibility study of ICTs applications to reduce cost of doing business by SMEs.	Low	n.a.	High	n.a.
R12	Expansion of State purchases from SMEs, by increasing online information on small tenders	Low	High	High	Medium
R15	Digital Literacy Training Program, aimed at school teachers, school administrators, government officials, micro-entrepreneurs, farmer leaders and women leaders.	High	Medium	High	Medium
R16	Pilot competitive grant fund to experiment with implementation of high impact rural poverty reduction initiatives.	Medium	Medium	High	Medium

IV. Community Access Centers: Learning from Experience

151. The definition of so-called telecenters varies considerably. In its simplest form the Telecenter is limited to providing public telephone, fax and/or Internet services. In Indonesia, these micro enterprises are called Wartel (*Warung Telepon*) and Warnet (*Warung Internet*), and are run for example on a family telephone connection in a spare room of a house, or in a pair of portable booths by the roadside.

152. There are over 200,000 Wartels and 2500 Warnets¹⁹ in Indonesia and both their user demographics/usage patterns and business models have been well documented (see insert). The geographic distribution of Wartels and Warnets closely reflects the distribution of fixed line telephone infrastructure, with the vast majority located in urban areas, while rural areas, particularly in Eastern Indonesia, remain un-served or under-served.

Recent data on cyber cafes, or Warnets:

- **Survey of Internet Kiosks in 5 Principal Cities**, USAID/PEG and the Ministry of Communications and Information, 2003.
- **Information Dissemination In A Developing Society: Internet Café Users In Indonesia**, Furuholt, Kristiansen, and Wahid, *The Electronic Journal of Information Systems in Developing Countries*, January 11, 2005
- The industry association APWIKOMITEL provides a **Warnet Direktori** on their website at www.apwikomitel.or.id. Established in December 2003 with support from the ASEAN Foundation, the website also has start-up tools and information on related regulatory and technology issues.

153. Multipurpose telecenters (MCTs), at the other end of the complexity scale, provide not only Internet and telephone access but equipped with printers, photocopier, etc., and may offer services for local small business and "teleworkers". MCTs might also provide access via the Internet (or regularly downloaded Web content served on a LAN to lessen Internet connectivity costs) to electronic libraries and databases, government and community information, systems, market and price information, etc.; access to closed user group data and voice networks; facilities and equipment for teletraining and telemedicine; (shared) office space for local small business; and equipment and training for local production and reception of radio and TV broadcasting programs.

154. In Indonesia, facilities of this kind currently exist only to serve the corporate market in Jakarta and a handful of other major cities, are high-priced by global standards, and assume a level of technological sophistication on the part of users.

155. The study focused on requirements for effectively reaching out to rural and remote areas; and the researchers assumed that the "Multipurpose" and "Community" aspects of MCTs - including at minimum specialized or localized content and user support and training - are an important component of sustainability in providing a community owned, shared information and communication facility for people living in rural and isolated areas; the sample of programs studied excluded the well documented Wartels and Warnets (discussed in the earlier chapter), and focus on programs both national and local, that provide more in terms of content and user support than simply commercial telephone and Internet access.

¹⁹ Krettek Internet: Indonesia Case Study, ITU, 2004

156. In Indonesia, there have been a number of initiatives to establish public access centers:

Box 4.1

- **Technology Information Kiosks (WARINTEK)** - Ministry of Research and Technology, the project began as a PPP intended to establish Internet kiosks throughout Indonesia, but was speculatively funded and ultimately the private sector partner folded. The project's most notable output was 2 CD-ROMs containing information on agriculture, fisheries, animal husbandries, food technologies / recipes, and traditional medicine, reportedly distributed to all districts and sub-districts, universities and schools in Indonesia. (20,000+ locations) (see also Box 4.2)
- **Information Kiosk (WARSI)** - Ministry of Industry and Trade, for SMEs.
- **Business Information Center (BIC)** - Chamber of Commerce (KADIN), for SMEs.
- **Community Electronic Information Network (JIMIE)** National Information Agency (LIN), provides government information to commercial Warnets.
- **Community Tele-Service Center (BIM)** Program developed by the Indonesian Information and Communication Society (MASTEL).
- **Technical Vocational Education Training (TVET)** – Ministry of Education Vocational Training Directorate (Dikmenjur) provides public access centers, community wireless networks and training for secondary students in programming and network administration.
- **Community Learning Centers (CLC)** - Ministry of Education local non-formal educational institutions, run in partnership with NGOs, local government, women's organizations, and religious groups. There are currently about 1,600 CLCs in Indonesia, but very few if any provide technology services or Internet connections.
- **Partnership for e-Prosperity for the Poor (PePP)** – Bappenas/UNDP, a project of the ICT for Poverty Reduction (ICT4PR) program, operates pilot project telecenters in rural communities.
- **Community Technology Learning Centers (CTLIC)** – Microsoft Corporation, operates technology training centers in regional cities. The program is the first manifestation of the Ministry of Communications and Information's Community Access Point (CAP) program.
- **Qaryah Tayibah**– Farmers Federation of Salatiga, a local initiative in Central Java providing public access, training and agricultural content for local farmers. (see also Box 3.2)

The field work compiled preliminary documentation on the programs outlined in the table above, and others that came to the attention of researchers during the course of investigation. The data obtained was compared against international best practice criteria garnered from successful CTC projects including IDRC's ACACIA program and the Pondicherry telecenters of IDRC's Pan Asia Networking (PAN) program. Special aspects of the Indonesian context were noted and possible success and failure factors identified. Key issues related to local content provision for targeted groups and financial sustainability were highlighted. The study also highlighted existing local content knowledge generators, identifying existing local language digital content development programs and indicating which agencies' knowledge is most needed by women and rural communities.

Summary of Field Visits

157. Based on analysis of preliminary data gathered through interviews with national program sponsors, five programs with the most promising characteristics as compared to best practice criteria were identified. The sample prioritized programs with locations in rural communities (classified Ibu Kota Kabupaten or smaller).

Program Name	Sponsor	Funding	Target Community	Programs and Services ²⁰				
				Internet	Training	Content	Biz Svc	Educ
ICT Center	Directorate of Vocational Secondary Ed. (DIKMENJUR) + Local Schools	Block Grant (DIKMENJUR) + Local budget	academic community and public	✓	✓	✓	✓	✓
Technology Information Kiosks (Warintek)	Ministry of Research and Technology (MENRISTEK) + Local Institutions	Incentive – Matching - Grants (APBD) + Local budget	academic community, professional associations, and public	✓	✓	✓		✓
Balai Informasi Masyarakat (BIM)	Indonesia Telecommunication Industry Association (MASTEL) + Local NGOs	Grant (Mastel) + Local in kind	Farmer groups, professional associations, SME, and public	✓	✓	✓	✓	✓
Partnership for e-Prosperty for the Poor (PePP)	UNDP & BAPPENAS + Local NGOs	Grant (UNDP) + Local in kind	Poor communities	✓	✓	✓	✓	✓
Community Training and Learning Center (CTLC)	Microsoft + Local NGOs	Grant (Microsoft) + Local in kind	Farmer groups, women’s associations, SME, visually impaired, youth groups	✓	✓	✓	✓	✓

During March, April and early May 2005 the study team performed site visits at a total of 9 centers organized under the five programs outlined above, including:

- **3 ICT Center** locations (2 in Irian Jaya and 1 in Jakarta)
- **2 Warintek** locations (in Tasikmalaya, W. Java)
- **1 BIM** location (in Cihideung, W. Java)
- **1 PePP** location (in Pabelan, C. Java) (Box 4.3)
- **2 CTLC** locations (in Mataram, Lombok and Bojonegoro, E.Java)

²⁰ These services are what the implementing agencies *claim* are in progress rather than reflecting the reality on the ground.

Box 4.2. Warintek Operations

Warinteks are science and technology information shops, developed by the office of the State Ministry for Research and Technology to improve and enhance the delivery of current science and technology information products and services through applications of ICTs. *Warinteks* provide data and information on science and technology (S&T) in the form of CD ROMs. The database consists of research reports (98.5000 entries), books and theses on gender and S&T (68.000 entries), gender papers (62.000 entries), patents in the country and international (4.200 entries), appropriate technology (15.274 entries), and a catalog of magazines (4.600 entries). Data and information available at *Warinteks* include economy, agriculture, appropriate technology, agribusiness, etc.

Each *Warintek* shop is equipped with computers with Internet access and CD ROMs containing appropriate technology for rural communities. Since its inception in 2000, *Warintek* shops have been established in many big cities all over Indonesia such as Jakarta, Bandung, Palembang, Padang, Bukit Tinggi, Malang, Surabaya, Jember, Sleman, Kupang, Lampung dan Jaya Pura.

Warinteks are usually integrated with local government libraries, university library or other organizations that provide information services for communities. *Warinteks* are mostly used by students, researchers and the community in general. Many of the users access scientific information for writing theses, research reports and other scientific reports.

In Sleman District, Yogyakarta, a *Warintek* shop located at the Local Government Library, Jl. Turgo 3, Beran, Tridadi, Sleman. The center has 7 computers with CD ROMs on appropriate technology and a link to the Internet. With Rp. 2000 per hour, about 10 to 20 users use the *warintek* everyday. Ms. Herawati and a staff of seven manage the shop from Monday to Saturday. Although there is no accurate data on men and women users, daily experience shows that there are more men users than women users.

To expand its reach to outlying villages, the Sleman *Warintek* recently started a *Mobile Warintek* service. This mobile service is in the form of a minibus that brings books and computers with CD ROMs directly to users in villages. The *Mobile Warintek* visits different villages daily according to its schedule. The minibus visits each village. So far, 8 villages have been covered by this mobile *warintek*. According to the *Warintek* manager, the response from villagers has so far been encouraging with young students making the most out of the resources. It is too early yet to say if the mobile *Warintek* will be popular within the rural communities in the area as a source of information to support farming and other economic activities. The potential is there though, if appropriate content (such as audio-visual materials that can be shown to villagers) that responds to the demands of the villagers are brought directly to these areas.

158. Findings

Scalability

- Both the Microsoft CTLC and UNDP/Bappenas PePP programs offer potential models, with some modification, for providing access and training at the village level.
- Both rightly put significant effort into identifying viable local NGO partners during the programme preparation phase, and their focus on computer skills based training provides a clear mission for the centres.
- BIM, though much celebrated in the Media and in government circles, is all public relations and no program. Easily the most widely known of the programs studied, it was also the weakest in practice at the local level, with no operational structure in place to permit scaling up.
- The Ministry of Research and Technology's *Warintek* program is much stronger as a content provision program than as a support system for rural access centers. *Warintek* deserves support to further develop its content aggregation processes.

- Dikmenjur's ICT Center and WAN-Kota programs offer, with PPP enhancement, a potential model for providing infrastructure, access, and training at the district capital level. Communication of goals between the national and local levels was most effective in the Dikmenjur program, and coordination and support mechanisms were understood at the local level, if not always utilized.
- Libraries offer some potential for use in establishing telecenters at the district capital level, but the system is weakly administered and may present severe organizational challenges to any significant scale-up.
- Village level initiatives will ultimately fail without support from a regional, i.e. district level, facility – if remote centers have to wait for a replacement part or a technician to arrive from Jakarta, the whole program may grind to a halt.

Content

- Although all of the programs' national sponsors claimed that content provision was a focus of their program, the fact on the ground is that none of the telecenter programs except Warintek are content focused. For example, at the Pabelan center, very little training has occurred (other than the English-language training funded by the Regional English Language Office of the U.S embassy). Training for the wider community has been limited to initial kelompok (community group) trainings. The complete trainings (3 sessions) were not always completed due to technical problems (e.g. power cuts) and administrative oversights (i.e. double booking of groups). There have been no follow-up activities. On the ground the project has been about establishing the telecentre and providing equipment i.e. **primarily 'access'** (in a technical sense) and **secondarily training**- although even the latter could be disputed at this stage (Robinson, pers. comm).

Warintek is the best existing content for telecenters program, and MenRistek is committed and knowledgeable in approaching issues such as gender. They are probably the best GOI partner to coordinate content development for telecenters.

- Libraries and Librarians offer some potential for use in developing local content, but would probably require extensive re-training and a high level of ongoing support.

Box 4.3. E-Pabelan Community Telecenter

The e-Pabelan telecenter, is a pilot project being implemented by the United Nations Development Program (UNDP), in conjunction with the National Planning Agency (Bappenas, Badan Perencanaan Nasional). It is a community development initiative using information and communication technology (ICTs) to improve the lives of the poor.

The objectives of e-Pabelan are as follows:

- To empower the poor in Pabelan with access to basic information such as market, farming, trading, education, and health information;
- To enhance the capacity of Pabelan people in accessing information, computer skills, telecenter management, etc. through trainings;
- To mobilize Pabelan people to improve their economy with community development initiatives using information and communication technology; and
- To build partnerships with stakeholders to develop the community in Pabelan.

Source: Bappenas/UNDP

Every day several students use the center, mainly students from the pesantren. In fact, many access it at all hours- much to the dismay of some of their teachers who would prefer they attended their classes. The public generally don't access it at night (when they would have the free time to access it) any more because either it is full of students from the Pesantren or students from the English course financed by RELO. The experience of e-Pabelan does not suggest that low participation is due to illiteracy and low educational attainment. Of course, if the point of reference is the head of the household this could perhaps be argued. However, within poor households in Pabelan (and elsewhere in Indonesia) educational attainment has increased significantly over the past few decades. For example, within poor households in Pabelan there are a few family members that are educated to degree level- but they still don't use the telecentre. Interestingly, some computer owners and some poor individuals with previous computer experience don't even use it. The rise in educational attainment should, in fact, be a plus for the use of ICTs in Indonesia. The reasons for low participation, especially by the poor, in Pabelan are varied and a bit more complex. Regarding awareness of the telecentre, just under half (46%) of the 216 poor households surveyed knew that there was a telecentre in Pabelan but only 3% of those households with knowledge of the telecentre thought the project was owned by the community. This stresses the fundamental lesson that the intended beneficiaries must be more fully involved in the planning and implementation stages of the project from the very beginning. (Robinson, 2005)

For the first year of operation (until about August 2005) all connection costs for Internet will be paid for by Bappenas to PT. Telkom. During this time, the center provides free of charge Internet connection for the users. The sustainability of the center is in doubt because the question of who will pay for connectivity

Operational Models

- All of the programs studied suffer from varying degrees of weak coordination between the national and the local levels. In general, the research revealed a wide gap between the vision and mission of programs as articulated by national sponsors and the reality of program delivery at the local level. Scheduling of field visits was difficult, as in many cases centers which national sponsors recommended were nonfunctioning. The most glaring example was Mastel's much promoted BIM program, which has received a great deal of media coverage and government attention (in Jakarta). The field visit revealed that the center has in fact been non-operational for over 6 months and, according to the local farming cooperative which operated the center, the sum of Mastel's contribution amounted to donation of two

PCs (one of which broke down after two months and was never repaired) and intermittent training during the program's first year.

- Programs which feature management by local NGOs (PePP and CTLC) are relatively more inclusive and gender balanced than government programs. They appear to encourage greater volunteer participation and an atmosphere of community ownership. However, because of their single purpose nature and remoteness from their sole source of grant funding in Jakarta, they are also more prone to operational breakdown due to lack of funding, spare parts, and human resources. As an example, when the study team visited the Microsoft CTLC center in Lombok operated by the local branch of the Indonesian Women's Coalition (KPI), the center had not offered Internet access (previously a money earner) for the past two months because the modem had broken down and the monthly (utilities) subsidy provided by Microsoft was insufficient to allow them to procure a replacement.
- The Dikmenjur program benefits greatly from close association with a credible and active institution (vocational high schools) at the local level. Support by school administration and the local government in the form of supplemental budgets, and human resources support from teachers and the parent community makes these programs more resilient and less prone to disruption due to isolation.

Business Models

- All of the programs which operate at the village level are grant funded, and none have firm plans in place for sustainability beyond the end of the grant period (perhaps the most common characteristic of all past and present telecenter projects in Indonesia). Sustainability planning observed by the study team ranged from a national/local sponsor strategy session (UNDP/Bappenas and the Pabelan Pondok Pesantren), to center operators contributing a percentage of their monthly transport subsidy to a fund intended to keep the center open a few more months beyond the end of grant funding (the KPI run CTLC in Lombok).
- Of the programs which operate in rural areas, only Warintek is structured to allow for significant entrepreneurial or private sector involvement (in many cases amounting to little more than a government subsidy to institutionally-based Warnets to purchase extra computers).
- Of the programs which charge fees for services, training in computer skills (primarily use of Microsoft Office) is most in demand. This was true for all centers except the Warintek, located at a university where a sizable student body created demand for Internet access.
- The high cost relative to income of dial up service via *Telkomnet Instan* in rural areas severely limits Internet access demand. Lack of local language content and lack of awareness and facilitation in the use of Internet content and services (such as VoIP) are also factors in low Internet access demand.

- Users generally indicated a desire for aggregated and localized content, but in the absence of compelling examples were noncommittal as to whether they would be willing to pay for it. At the Warintek center located at Siliwangi University in Tasikmalaya (the other Warintek center visited was nonfunctioning) demand for Warintek content was negligible, and the center functioned primarily as a Warnet.
- None of the centers surveyed took advantage of potential income from other high demand services, such as editing and printing cell phone photos. GSM network coverage was available in even the most rural centers visited, and cell phones were ubiquitous. The operator of the Garis Tepi farmers' association CTLC ran a side business selling pulsa refill vouchers and cell phone accessories from the center building, but had never considered printing photos or selling ringtone downloads to create income for the center, and expressed doubt as to whether this would be "allowed" by Microsoft. In fact, Microsoft and Yayasan Mitra Mandiri have no objection to these types of activities as long as they don't detract from the CTLC training mission, but local operator understanding of options for revenue generation was very limited in all of the remote, rural centers visited, and local operators generally displayed a hesitant and inordinately deferential reserve in undertaking any initiatives not expressly sanctioned by the national grant giver.

159. Recommendations

R1 The effort to build viable rural information systems in Indonesia should begin with the establishment of MTCs/support centers at the Ibu Kota Kabupaten level, and then extend to the village level via a "hub and spoke" structure. This could effectively be accomplished by marrying access center development to the deployment of community owned wireless networks. Dikmenjur's existing program incorporates both of these functions (as well as community radio) and with private sector management could provide an effective vehicle for delivering both community-wide infrastructure and access services.

R2 Private sector management of publicly owned facilities should be a cornerstone of any future telecenter program, to provide the greatest chance of financial sustainability and to encourage a wider user base - beyond members of just one local NGO/organization. At both the district and village level, entrepreneurship should be encouraged, and the aim should be to create "Integrated Technology Service Centers" with multiple low overhead and low cost revenue streams, including:

Non-Internet Revenue Drivers:

- Training
- LAN Gaming
- Computer Rental, Scanning, Printing
- Cell phone Digital Photo editing and printing, and ringtone downloads

Low Bandwidth Internet Revenue Drivers:

- VoIP (Skype or other service Micropackaging)
- Information and eMail 'dump' (scheduled download) services
- Internet Access (surfing and chatting)

R3 To promote development of a wide user base, a mechanism for providing support for local public and civil sector organizations to associate and pool resources should be established. Existing programs tend to rely on just one local partner organization/operator, limiting the user base and overall impact of the program. There is no reason why a farmer's association and a women's microcredit organization and a local government Health service office (Dinas Kesehatan), for example, could not all jointly sponsor a telecenter.

R4 To encourage local organizations to take initiative, a mixed system of credit and grants to procure and deploy facilities should be established. Centrally administered grant programs based in Jakarta are cumbersome, require a great deal of administrative overhead, are potentially prone to corruption and abuse, and are inflexible in responding to local needs. Locally driven programs (with appropriate safeguards including contracted private sector management vetted by the World Bank or other program sponsor, and a transparent local ownership structure) would more accurately respond to needs and demand at the local level.

R5 Localized content development programs should be undertaken with support from information mobilization specialists, as the ability to determine content needs (as opposed to skills training) is limited at the local level. This area needs further study by area experts as many of the researchers' findings were counterintuitive. For example, when farm groups were queried as to the usefulness of up-to-date market price information, most indicated that this would be of little use, and preferred access to an "introduction" service to buyers whom they could trust, because without the personal relationship with the buyer, crop prices based on statistical averages were perceived to be of little use.

R6 Due to the high cost, low speed nature of Internet availability at the village level, content development programs should focus primarily on aggregating content which can be provided either on CDROM or, for more temporal data, via a scheduled download and then shared over a LAN, to minimize Internet access costs.

V. Bridging the Gender Divide

Background

160. After years of work and mounted evidence showing the importance of careful gender analysis in all aspects of development work, it is still important to lay out the basic rationale and clarify why we should consider gender analysis and develop action plans that are gender aware. For purposes of this report, it is important to clarify why there is a concern for gender equality in ICT for development. And the most basic point is that, such as with other technologies, ICT are not gender neutral.²¹ In fact, access to and use of ICT is greatly influenced by socially constructed views of technology, who uses it and how.

161. Information and communication technologies (ICT) comprise a complex and heterogeneous set of goods, applications and services used to produce, distribute, process and transform information. The ICT sector consists of segments as diverse as telecommunications, television and radio broadcasting, computer hardware and software, computer services and electronic media (for example, the Internet and electronic mail).²²

162. Over the past decade, there has been a growing understanding that these technologies can be powerful instruments for advancing economic and social development, including gender equality and women's empowerment.²³ However the benefits of ICTs have been unevenly distributed among sectors and socio-economic groups, between urban and rural areas and among women and men. Poverty, illiteracy, lack of computer literacy and language barriers are among the factors impeding access to the ICT infrastructure, especially in developing countries. Specifically, women's capacity to exploit the potential of the new information and communication technologies as tools for social and economic empowerment is constrained in a number of ways, such as social and cultural determinants, income levels, education levels and illiteracy, lack of knowledge on the potential of ICT, among others. According to a recent report, the following are some key socio-cultural factors that constrain women's use of ICT, particularly in rural areas:²⁴

- “Cultural attitudes discriminate against women's access to technology and technology education.
- Women are less likely to own communication assets – radio, mobile phone.
- Women in poor households do not have the income to use public facilities.
- Information centres may be located in places that women are not comfortable visiting.
- Women's multiple roles and heavy domestic responsibilities limit their leisure time. Centres may not be open when it is convenient for women to visit them.
- It is more problematic for women to use facilities in the evenings and return home in the dark.”

²¹ Nancy Hafkin, “Are ICT gender neutral?”, Lead report for the UN-INSTRAW discussion list on gender and the digital divide. July 2002.

²² Gillian Marcelle (2000). “Transforming Information & Communications Technologies for Gender equality.” Gender in Development Monograph Series #9. New York: UNDP

²³ UN-DAW, Information and communications technologies and their impact on and use as an instrument for the advancement and empowerment of women, report of the Expert Group Meeting, Seoul, Korea, 11-14 November 2002.

²⁴ Anita Gurumurthy, Gender and ICTs, Overview Report, Bridge Cutting Edge Pack, September 2004, page 24.

Policies and projects that address access to ICT must consider the above constraints if they are to provide equal and universal access to ICT. In fact, recent research and analysis shows that they must consider gender from the start and need to ensure that gender analysis is an integral component from the planning stages, and only then will they indeed make a contribution to gender equality in access to ICT.²⁵

163. While ICT can deliver potentially useful information, such as market prices for women in small and micro-enterprises or health care guidance in terms of current diseases, it is only one element in a longer chain of resources necessary to affect sustainable development. Where there is no access to roads, transport, and clean water, and women have limited access to credit and other development inputs, the access to and use of ICT will be limited in its impact. It is therefore important to complement the provision of ICT facilities with additional services and training that will build the capacities of women as well as men to act on the information and knowledge accessed through ICT.²⁶ ICT will not be useful tools unless planners and policy makers are clearly aware of the socio-economic and cultural context of women's lives, particularly poor rural women, and are able to provide for ICT access that responds to their specific development needs both in the short and long terms.

164. This view is reiterated by recent analysis conducted by the UN Food and Agriculture Organization (FAO), which points out that it is important to review the potential of ICTs from two broad approaches. First, their application directed to rural women as primary users of these technologies, and second, their application directed to improving the quality of life in rural communities, which in turn will assist rural women to improve their lives. It is therefore necessary to adopt a more holistic view of rural life, rural community service and resource needs, as well as rural women's role as stakeholders in rural enterprises and related services.²⁷

165. Experience has indicated that reaching women, particularly in rural areas in developing countries, is facilitated by using multiple forms of media and communications technologies, such as radio (e.g., the Development through Radio program in Zimbabwe, which facilitates listening clubs to ensure exchange of relevant information), CD-ROMs (e.g., the "Rural Women in Africa: Ideas for Earning Money", which provides business information in the local language using audio technology and reaching rural poor and illiterate women), and video (e.g., women associated with SEWA in India have produced videos documenting rural women's lives and used them to influence policy makers and to educate others on women's lives and socio-cultural environments).

166. Investment in content development at the local level based on local information needs is key to facilitating increased women's access and relevant use of ICTs. Greater attention should be paid to recognising women and the poor as information producers. Capacity building programs are central in this context and may focus on such activities as collecting, packaging and disseminating local knowledge. Equally important is the task of ensuring that new technologies, such as the computer and the internet, are used in combination with

²⁵ Nancy Hafkin and Sonia Jorge, *Get in and get in early: Ensuring women's access to and participation in ICT projects*, Women in Action, No. 2, 2002.

²⁶ Primo, Natasha (2003). "Gender Issues in the Information Society", UNESCO: Geneva.
http://portal.unesco.org/ci/en/file_download.php/250561f24133814c18284feec30bb5egender_issues.pdf

²⁷ Revathi Balakrishnan, "Harnessing ICTs for the Advancement of Rural Women: FAO Perspectives and Strategic Actions, Working Paper, November 2002.

existing and widespread technologies, particularly those reaching rural women, such as radio, television, and print media. The provision of relevant local language content, via affordable and easy to use technologies that are accessible to an audience with few or no reading skills, is crucial if ICTs are to meet the needs of women in developing countries like Indonesia.

Rural Women in Indonesia: Some key considerations

167. Women play pivotal roles in the agriculture sector in Indonesia. Rural women's labor force participation in the sector is sixty-one percent (61%), and it is estimated the women carry out 75% of the farm work in rice production.²⁸

168. Surveys²⁹ at the village level indicate that women work more hours than men. One such study found that adult men work an average of 8.7 hours per day, while women work 11.1 hours. Men tend to spend significantly more time than women in formal social and religious activities.

169. Because of Indonesia's high population density, large inequalities of land ownership and increased landlessness, rural people can no longer rely on agriculture alone. Increased numbers of rural women engage in wage labour, non-farm or off-farm income generating activities.

170. The most common income generating activities that women undertake are livestock, small enterprises, agricultural processing, home gardens and small agricultural plots. The government promotes income generation through micro-credit schemes such as Kelompok Usaha Bersama (KUB) funded by the government owned commercial bank, the National Family Planning Coordinating Board (BKKBN) and the Village Cooperative Units (KUD).

171. The economic crisis of 1997 severely affected women and children with drops in education, health and nutrition. In order to increase family income for food security, women have taken additional jobs. This is indicated by statistics that show that women's housekeeping work decreased by 2.7% and their participation in the labour force grew from 1.8% to 4.2%, post-crisis.³⁰

172. Owing to women's substantial contribution to the family resources through independent income generation, they hold greater influence over household expenditures than they might otherwise have. Thus, women tend to play an important role in decisions about the allocation of household resources in Indonesia. This is also strongly reinforced by prevailing cultural attitudes concerning the reputation of women for economic acumen, thrift and foresight, and trustworthiness in putting family interests before their own desires.

173. Outside the household, however, women remain generally subordinate to men. They are unlikely to be represented in the planning and implementation of development projects at the local level. This is also true in the case of political leadership at the community level, but it extends also to economic relationships in important areas.

²⁸ FAO. Fact Sheet Indonesia: Women in Agriculture, Environment and Rural Production.

²⁹ The World Bank. 1992. "Indonesia: Women in Development, a Strategy for Continued Success".

³⁰ FAO, op.cit.

174. Women face a number of constraints in obtaining access to capital and credit. According to a World Bank study³¹, there is significant demand among rural women for working capital and investment credit for their businesses. Collateral for loans tends to be a problem, especially if land titles are required, since these are most often in the name of the (male) head of household. Although there is no legal gender discrimination in land ownership, the traditional social norms and customary laws constitute a barrier to women's equitable access to productive resources.

175. And while women carry major responsibilities in farm management decisions and actual labour, there is very little opportunity for training and limited access to agricultural extension services. Most of Indonesia's agricultural research has been on rice production, with very little attention to other crops, and almost none directed to the "home garden". Customarily, only male heads of households are invited to training sessions and research results is normally targeted to "lead farmers", few of which are women. Hence, despite the active role that women play in agriculture – as decision makers and as labourers – they are most often excluded by default from direct access to extension services.³²

176. According to the Ministry of Communication and Information Technology (MCIT)'s E-Strategy Report (2004), many women's groups in rural areas are organized around thrift and assistance provided to them in terms of micro-credit, technology and marketing initiatives. Survey of these groups show that women have been able to earn additional incomes and women's cooperatives have proved to be "model borrowers with a virtually unblemished record of repayments to banks and financing institutions". The report also makes the point that a number of these women's groups have begun to use computers for maintaining their accounts for acquiring skills in manufacturing superior products or providing services.³³

177. However, the use of ICTs by women in rural areas is currently very limited due to problems of access and lack of capacity. Experience in other countries illustrate that strategies for reaching women in rural areas effectively use multiple forms of media and communication. A project in Malawi called Farmwise is a project involving a database system, an online input calculator, and email, which is helping women farmers in rural village of Mwandama in Zomba district, to improve agricultural production. The project developed a computer database system with a web interface and email facility to help women farmers determine what they can expect to harvest from their land, which crops they can grow given the soil type and fertility, and what inputs they should use.³⁴

178. As in many other regions in the world, Caribbean women play a vital if under-recognized and unsupported role in food production. They are less likely to have access to land, extension training, affordable credit and loans than men, yet studies indicate that they make up to 65 per cent of agricultural production and 80 per cent of marketing decisions. There is a growing market for organic products. Organic farming is highly knowledge-

³¹ The World Bank, op. cit.

³² Ibid

³³ Ministry of Communications and Information, "Final Report: Indonesia's E-strategy, Jakarta, December, 2004.

³⁴ Bessie Nyirenda (2004) "Malawi: Farmwise", ICT Update, Issue 21.
<http://ictupdate.cta.int/index.php/article/articleview/366/1/69/>

intensive, however, and women farmers often lack the means to learn more about organic production methods. While opportunities exist to tap into local and even regional markets, women farmers tend to be isolated from market information. To overcome these challenges women farmers were trained take advantage of the Internet to access and exchange information about organic farming methods, promote their business, and market their product through tapping into networks that already exist on the Internet, and were trained in participating in online user groups.³⁵

179. These experiences are valuable and illustrate just a few ways in which rural Indonesian women can also benefit from ICT and learn from other rural farmers from around the world.

ICT in rural Indonesia: a gender perspective

180. There is still a long road ahead before all Indonesians can benefit from the full potential of ICT. That road seems even longer to rural women. Despite some improvements in access and the rapid deployment of lower cost wireless technologies, not much has changed in rural areas of Indonesia. Infrastructure in rural areas is limited and existing services are expensive and practically outside of rural women's reach. Women still face enormous barriers to access communications, and information relevant to their realities is very limited. This section of the report provides a gender perspective on the status of ICT in rural areas of Indonesia and presents the main findings of our gender analysis. The discussion is illustrated by case studies developed by the team and based on the field research. These findings focus on five main areas:

- Connectivity and access to information
- Capacity building and ICT in education
- Use of ICTs for grassroots women's organizations
- Gender mainstreaming within the Government: the Ministry of Communications and Information Technology and the Ministry of Women's Empowerment

181. These areas were identified as priority areas and do not reflect an exhaustive analysis of all issues that could be considered. Instead, these areas reflect the urgency of issues as expressed by women and organizations, as well as the teams' expert analysis of gender and ICT issues.

A. Connectivity and Access to Information

182. Availability and affordability of telephone connections, especially at the village level, remains the major barrier for access in rural Indonesia. There has been limited interest among telephone operators to provide fixed line telephone access in rural areas, primarily due to high cost of serving those areas and resulting low returns on investment. Public telephones are scarce and often do not function. Internet services are limited to a handful of cities and service fees are still high for most rural poor women. Of 35 operating ISPs, few provide access to the Internet in remote locations due to the prohibitive costs associated with

³⁵ Source: Nidhi Tandon (2004) "The Caribbean: ICT tools for women organic farmers : the Knowing & Growing Network", ICT Update, Issue 21. <http://ictupdate.cta.int/index.php/article/articleview/367/1/69/>

connectivity.³⁶ According to a UN E-readiness report, the proportion of female internet users in 2000-2001, among the 39 countries for which data was available ranged from 51 percent in the US to 35 percent in Indonesia."³⁷ Of 35 operating ISPs, few provide access to the Internet in remote locations due to the prohibitive costs associated with connectivity.³⁸ (see also Chapter 1 for more details).

183. With the exception of the Farmers Federation in Salatiga, all projects and sites covered by this study had limited or no connectivity available.³⁹ In general, the most common mode of communication, aside from face-to-face, is through cell phones and handy-talkies. Internet access is extremely limited, and mainly available to and used by students, teachers and other professionals, government officials and employees, village council officials and staff, and farmer organizers (see Table 5.1). Almost no sex disaggregated data was available that can accurately measure the differential access between men and women in Indonesia specially in rural areas. Based on interviews conducted, one can easily conclude that women have far less access to ICT than men.

Table 5. 1 Comparative Access to Connectivity and Information in Six Study Sites

³⁶ The Ministry of Communications and Information, "Final Report: Indonesia's E-strategy, Jakarta, December, 2004.

³⁷ UN E-Government Readiness Report 2004, p 98, <http://www.unpan.org/egovernment4.asp>

³⁸ The Ministry of Communications and Information, "Final Report: Indonesia's E-strategy, Jakarta, December, 2004.

³⁹ In Salatiga, the Farmers Federation and its alternative schools have 24 hour internet connection provided by the local ISP.

	Sukabumi	Malang, East Java	Salatiga Farmers Association and Alternative school	Sleman Warintek	Magelang District office, and	Wonogiri
What type of access is available?	Cell phones Internet connection through flexi – at the training center	Cell phones Landline Internet through training center	Cell phone Landline Handy-talkie Internet connection- 24 hour connection	Internet connection through Warintek	Cell Phone Handy-talkie Internet connection through E-Pabelan telecenter; District office	Very poor cell phone connection Handy-talkie No internet connection
Who has access?	Cell phones – trainers, local government officials. Internet – only the trainers, mostly female.	Cell phones – cooperative staff, organizers and some members, who are mostly female.	Cell phones – association staff, farmer organizers and some staff. Internet connection – Farmer association staff and farmer organizers, most of whom are male. Teachers and students where differences in male/female are insignificant.	Internet connection – students, teachers/professionals, some government employees and other community members who use the Warintek. The head of the library estimates that 60% of users are males and 40% females.	Cell phones –district office employees extension workers, entrepreneurs and some farmers, mostly male. Handy talkie – local government and district office Internet connection – some district office staff and extension workers, mostly male.	Cell phone – extremely limited to community leaders. Handy talkie – local government office who are mostly male.
How is connection being used?	Cell phone are most commonly used for communication Internet is only being used by trainers of the center mainly to send reports to partners and funders and occasionally to look for information.	Cell phones are used by workers and organizers for regular communication within the cooperative. Internet is only seen as a part of a training activity and not yet used for information nor communication purposes.	Cell phones are used by workers and organizers for regular communication within the cooperative. Internet is only seen as a part of a training activity and not yet used for information nor communication purposes.	Internet is used mainly by students, professionals and government employees for email communication and for accessing information.	Cell phones and handy talkies are used extensively for regular communication and monitoring of market prices of produce among the district extension workers. Internet use is limited to once a week use by only a few staff members due to the high costs.	Cell phones are extremely limited in use. Handy talkies are used for official communication between the village council and the District government office.

Information and content for rural women

184. Aside from expanding connectivity, the lack of relevant information in the local language (e.g., information useful for women's needs with respect to their productive roles) presents a key challenge. As pointed out earlier in the report, women participate in agriculture as well as non-farm or off-farm income generating activities in very significant ways in rural Indonesia. Access to information, agriculture or otherwise, that can support their economic activities is a critical need.

185. Currently, the main sources of information for women are their family and community networks (including community organizations and cooperatives), the community radio (when there is one), television, and printed media (including informational pamphlets distributed by the government's ministries and disseminated by health workers or others). However, these sources are more likely to be simply distribution agents and not producers of information. It is the production of relevant local, regional or national content that needs urgent attention. ICT can facilitate the production of local content and the frequent updating of such content.

186. In 1996, the World Bank conducted a social and gender analysis study to provide background information on the social and agricultural profile, and the gender relations in the existing extension support services for a five-year capacity building project⁴⁰ in the country. The study indicated that women's contributions are important in agricultural production, but they hardly participated in extension activities because their contribution was not socially recognized. Some gender issues identified in the study at the time that may influence the effectiveness of extension delivery were group meetings which were considered men's business; meeting schedule conflicts with women's regular/domestic work; women do not talk in mixed groups, etc. Since gender relations and issues were considered specific for each community, it was recommended that gender-related issues be identified in all participating districts. Based on field visits to one of the districts information was gathered that identifies some of the continuing barriers in accessing gender related information that rural women face (Box 5.1).

⁴⁰ Decentralized Agricultural and Forestry Extension Project (DAFEP), 1999-2005.

Box 5.1 KIPP Kabupaten Magelang, Central Java

The KIPP in Kabupaten Magelang, Central Java is one of the sites of World Bank funded project **Decentralized Agriculture And Forestry Extension Project (DAFEP)**. DAFEP was a capacity-building project with the objective of enhancing the farmers' capacity to participate in and to lead in extension activities, and to strengthen the capacity of the district level integrated agricultural and forestry extension system. The project strategy was focused on a farmer-first participatory approach.

At the onset of the study, it was noted that there was a lack of capacity in the extension system to assess and analyze social and gender issues in the field. This limitation resulted in the failure of extension programs to address the location and gender specific needs and opportunities within their districts.⁴¹

The DAFEP project included a media dissemination component that was implemented at the district level. According to the project's media team, media resources such as fliers, radio, books, journals, posters, VCD and newspapers included sex desegregated data and gender responsive information relating to the results as well as other information related to the project. Some of this information is online.

In Magelang, officials and staff of the district office identified two gender-related activities, one of being poor farmers training program where 80% of members are women and the other is the establishment women's groups by extension workers. However, it was evident that specific efforts that specifically aimed at facilitating women's access to relevant agricultural information continued to be a critical need in the district. Much of the information that comes from the district office of the Ministry of Agriculture for rural communities is related to topics such as organic farming, horticulture, fisheries and forest management. For example, a topic that could be relevant to women is about "home gardens". Women contribute considerably to household income through farm and non-farm activities. Kitchen gardens, which are managed by women, contribute to 20% of household income and 40% of domestic food supplies.

Access and information via the internet

187. Data from a survey conducted of 270 users of 15 Warnets in Yogyakarta carried out in November-December 2003 gives an indication of differential access of women and men to the internet.⁴² The questionnaire respondents were all customers in Internet cafés in Yogyakarta. Game centers and university-owned Internet cafés were excluded from the sample.

188. Data collected showed a split of 32% female and 68% male users. The researcher noted that teenagers (students) and women could have been underrepresented in the sample, as a result of the higher morning sampling rate. Use by these groups tend to be higher in the afternoons and evenings. The data also revealed that both women and men had very low access from their homes (7% male and 5% female) and workplaces (12% male and 9% female). Women used the internet mostly to search for information, email, chatting and

⁴¹ These history and observations were derived from a meeting with the Ministry of Agriculture.

⁴² The survey was carried out by Fathul Wahid, of the Department of Informatics, Faculty of Industrial Technology, Islamic University of Indonesia. The survey was carried out in connection with research under way by Kristiansen, S., Furuholt, B., Wahid, F. (2005), "Cyber cultural diversity: The use of Internet cafés in Indonesia", Working paper. School of Management, Agder University College, Kristiansand, Norway.

reading news online. Most of the users come from the 20-29 age range with a very small number who are between 30-39 years old.

B. Capacity Building and ICT in Education

189. According to an East Asia Update recently prepared by the World Bank⁴³ (girls' educational attainment has seen significant achievements in East Asia, including Indonesia in increased literacy rates, enrolment rates, or completion rates particularly in primary education. The report points out that equality at secondary level has been harder to achieve although Indonesia has succeeded. The bigger issue is the gap for both boys and girls between urban and rural areas. The greatest gaps are found in tertiary education, suggesting a perception of higher opportunity costs associated with remaining in school, and the seemingly low returns on education for girls – or in some countries, boys – at that level. The report points out increasing the number of access to secondary education for both boys and girls through an increase the number of schools in rural and remote areas will go a long way in boosting their human capital and securing greater returns to education.

190. Women and girl's high illiteracy rates and the lack of ICT training are two of the most serious barriers that prevent them from entering the information economy. Continuing gender gaps in education, due to domestic responsibilities, lack of mobility and socio-cultural practices that downplay the importance of education of girls, constitute enormous challenges for women and girls. Language and basic computer literacy are pre-requisites for women and girls to benefit from the use of ICT for education.

191. According to a 2003 report on ICT for human development in Asia, detailed sex-disaggregated data on formal ICT education in Indonesia is not available apart from university and college enrollment that show that males outnumber females by 50% while among faculty in ICT colleges and universities, the ratio is 1 female to 3 males⁴⁴.

192. Nevertheless, Indonesia's E-strategy Report puts emphasis on addressing the Millennium Development Goal related to eliminating gender disparity in primary and secondary education and identifies ICT education as a strategy for closing this gender gap. As part of this strategy, the Indonesian government has launched several special initiatives by emphasizing on computer and computer aided education in schools such as MCI's "One School and One Lab" (OSOL) program. This program aims to increase the capability of Indonesian students in using ICTs and is now in 51 schools in the country(see Table 5.2). MCI, as the implementing agency, hopes that the program will help schools in providing ICT infrastructure as well as to facilitate schools (students and teachers) in their learning and teaching process particularly in access to information. This education project can potentially benefit girls and boys if gender considerations are included in its design and implementation. In many developing countries, computers are being introduced in schools as a tool to support the learning process. Research has shown that classrooms are not free from gender bias and therefore gender-sensitive planning of ICT interventions is a precondition to ensure equal access and effective use by girl students of computers in the classroom environment. An

⁴³ This Special Focus was prepared by Gillian M. Brown, Laila Al-Hamad and Carmen de Paz Nieves of the World Bank's East Asia and Pacific Region Social Development team.

⁴⁴ Promoting ICT for Human Development in Asia: Realizing the Millenium Development Goals – Indonesia. APDIP, APRI-HDRs and UNDP, pp73-74

evaluation of the experience of introducing ICT education in four African countries shows how gender inequalities plays out in classrooms between boys and girls.

Box 5.2. ICT for education in African countries

World Links, an organization that promotes international tele-collaboration among secondary school teachers and students in developing countries, commissioned a gender assessment study in 2001. The research focused on male and female students in four African countries: Senegal, Mauritania, Uganda and Ghana. The evaluation found that despite efforts to make the programme gender-sensitive, gender inequalities in access persisted. In some schools in Uganda and Ghana, girls do not enjoy equitable access to the computer labs. High student-to-computer ratios and first-come-first serve policies do not favour girls who are typically heavily outnumbered by boys at the secondary level. Girls have earlier curfew hours and domestic responsibilities that limit their access time. Proposed measures to correct this gender bias included encouraging schools to develop “fair use” policies in computer labs, conducting gender sensitivity sessions and advocating for reducing after-school duties of girls to give them more time.

Source: Anita Gurumurthy, Gender and ICTs, Overview Report, Bridge, September 2004, <http://www.bridge.ids.ac.uk/reports/CEP-ICTs-OR.pdf> and Victoria Tinio, ICT in Education, e-ASEAN Taskforce and

Table 5.2: Total number of schools that have received support through the OSOL program (as of February 2005)		
No.	Districts	Total
1.	Batam	6 School
2.	Tanah Datar	3 School
3.	Samarinda	8 School
4.	Penajam Paser Utara	3 School
5.	Balikpapan	15 School
6.	Kutai Kartanegara	2 School
7.	Bontang	4 School
8.	Jakarta Utara	1 School
9.	Garut	3 School
10.	Aceh Utara	4 School
11.	Aceh Timur	1 Pesantren 1 Madrasah
Jumlah		51 School
Source: MCI data		

Computer literacy and Capacity Building for Women in Poor Communities

193. According to MCI there are currently 1600 community learning centers (CLCs) in Indonesia. CLCs are defined as “local educational institutions outside the formal system providing a variety of learning opportunities for community development and improvement of people’s quality of life”.

194. Initiatives that focus on educating women in poor communities and teaching them computer literacy have demonstrated the value of ICT for women. For example, a recent study of nine projects with a specific focus on women and youth in South Asia showed that ICT use are valued for providing a different model of teaching and learning which is practical, functional and hands-on. These projects contribute to women's access to information that are useful for their livelihoods.⁴⁵

195. A community training and learning initiative of an Indonesian women's organization included in this study illustrate the value of capacity building for women in rural areas. Preliminary evaluation of the impact of its work shows that the benefits to the community, and particularly to women, include increased capacity of girls in using computers supporting their education, development of local content on women's concerns such as reproductive health of women in the village, collection and computerization of sex disaggregated election data, strengthening of social networks as demonstrated by voluntary support by villagers and in extending the resources to other villages, and finally personal empowerment of the coordinators of the center who are recognized as role models in the community.

⁴⁵ Don Slater and Jo Tacchi 2004. "ICT Innovations for Poverty Reduction". UNESCO. p 89.
<http://www.bellanet.org/leap/docs/136121e.pdf?OutsideInServer=no>

Box 5.3 Community Learning and Training Center

PUSTEKIM (Center for Community Training and Learning on Information Technology (CTLIC) is a project initiative of an NGO called Koalisi Perempuan (Indonesian Women's Coalition). Koalisi Perempuan Indonesia (Indonesian Women's Coalition for Justice and Democracy) is a women's mass organization with individual members base established in 1998.

The CTLIC is a 2-year pilot project, funded by Microsoft Indonesia, that provide training for women in mostly Microsoft applications (Word, Excel, Powerpoint, internet use, Encarta). The project started in December 2003 and is being implemented in five provinces namely West Nusa Tenggara, Bengkulu, West Sumatera, Jambi and West Jawa. The objective of the project is to encourage the communities, women and girls in particular, to use and benefit from ICT in their daily lives.

In West Jawa, a Pustekim is located in the village office of Pawenang, Nagrak, Sukabumi District. ICT literacy for women is very low in this area and women have less access to resources, including technology, as compared to men. Like many others villages in West Jawa, women and girls in Pawenang face constraints including lack of education, due to poverty. Older and less educated women are mostly employed in vegetable farms, food processing, households and as traders. Those who have completed high school, work in factories in nearby industrial areas.

There are six computers from Microsoft in the center. More than 340 (60% females and 40% males) have completed training. The demand for training in the community is high. The center has a waiting list of trainees and there are courses that run till midnight. Aside from Pawenang, the center has had to expand its coverage 4 other nearby villages. The trainees are a mix of students, employees, housewives and others. The computers are also rented out to the community and other users include local government staff, farmers and fishermen living in the area. Internet connection is very limited because connection is only through a scheme called Flexi, which relies on cell sites, and is very expensive. Therefore, only trainers use the internet and only to send reports to Microsoft and the Koalisi Perempuan.

A critical issue for the CTLIC are building sustainability beyond the support of Microsoft which will end by March 2006. Aside from equipment support, Microsoft finances 50% or the operational expenses of the center while the center's income from training fees covers the rest. Sustainability strategies that are being explored can potentially expand the CTLIC's service to the community. This include moving beyond software training and building capacity to use the tools for different purposes, including new business opportunities, finding better jobs, development of more local content and generally more support on how to use ICT/computer skills for greater social and economic impact. The local government unit has realized that the Pustekim has helped a lot in advancing its women empowerment program, particularly in the village level and has approached government training authorities for possible support.

C. Use of ICTs by grassroots women's organisations

196. ICT interventions that are directed at economically empowering women capitalize on the potential of these technologies as knowledge and networking tools for women as producers and distributors of goods. The tools are used to connect women to new and wider markets, broaden their social networks and provide them with information that opens up important economic opportunities. ICT can provide new opportunities for women's economic empowerment by creating business and employment opportunities for women as owners and managers. Such economic activity can lead to some of the following results:

- creating an environment where women feel comfortable participating in community development activities and advocating for their needs and priorities;
- developing ICT-based tools that address women's specific needs and that are run by women (e.g., literacy programmes, business planning courses, ICT training, access to

- market and trading information services and e-commerce initiatives);
- offering economic opportunities in salaried employment and entrepreneurship, as well as in the ICT sector itself and in jobs enabled by ICT.

197. There are numerous women's organizations in Indonesia, a few of which are investing in ICT for development or in ICT for their own organization's strategic use (communications, information, etc.). Such organizations include the network of strong and well established women's cooperatives that reach a great number of grassroots women. These organizations present a great opportunity to facilitate greater knowledge for development as they could naturally develop into community access points or even ICT service providers. Puskowanjati and Suara Ibu Peduli are good examples of organizations with incredible experience in the financial field, trusted staff and proved management skills.

198. Suara Ibu Peduli or the Voice of Concern Mothers (VOCM) has about 10,000 members in Jakarta, Bogor, Tangerang and Bekasi (Jabotabek) area. Out of this number, about 700 are members of cooperatives. The cooperative provides cash credit for small business ranging from Rp. 500,000 up to Rp. 3, Million with the interest 2% per month. The VOCM office has not used internet yet for their communication with the members as well as to gather information related to their work. The main mode of communication among the members as well as with the board members of the organization is bridged by six extension workers who work six days a week.

199. Computer use in the head office is mainly for word processing, particularly related to the secretarial work, such as writing letters and articles. The VOCM realizes the importance of ICT for their work and they expressed the desire to take advantage of ICT for their networking with the field coordinator of the cooperatives.

200. However, the same case studies show that there is a lack of awareness and knowledge about the full potential of ICT for development. In fact, most training activities focus on learning software and very little time is devoted to **networking skills, advocacy, information and content development, and use of different technologies**. There is clearly a need for training in this area, and it is fundamental that trainers be trained to open the possibilities and facilitate strategic use of ICT for development purposes. The case studies presented here demonstrate how ICT applications and content can be useful to rural populations, such as farmers, small business owners, community health centers and schools.

Box 5.4. Puskowanjati, the Central Women's Cooperative in East Java

Puskowanjati, the Central Women's Cooperative in East Java is a secondary cooperative with a current membership of 43 primary cooperatives in the East Java region. Each primary cooperative has 300 to 11,000 individual members, with a total current membership of 45,000 women among all primary coops. Of these, 54 percent are reported housewives, 19 percent micro business owners, 6 percent active in agriculture, 1 percent active in animal husbandry, 1 percent active in handicrafts, and 20 percent miscellaneous activities.

The Cooperative is a well organized and trusted institution, with years of experience in servicing their members. Puskowanjati has implemented several programs in its area and has developed into a strong organization capable of managing a substantial micro financing program in addition to several support programs to its members. *Training* women was always a focus of Puskowanjati. A new ICT project that is a recent initiative of the cooperative has already trained 60 women (from primary cooperatives) on computer skills (focusing on Microsoft software applications and basics of the internet) in a period of six months. Training focuses on software applications for financing and management activities. The current trainers are from other cooperatives and include three men but no women trainers. Currently, information dissemination methods are mainly done through staff and extension workers that provide training, guidance and information at cooperative premises, face to face help and assistance, particularly with illiterate members and quarterly publication with news on cooperatives' activities.

Most cooperative offices have one basic telephone line but fax machines are not common. There is no internet connection at the primary cooperatives. Some micro credit loans have been used to acquire computers but most cooperatives operate without any computers. There is no community radio used for information sharing. Members use basic telephone and, increasingly, cell phones. Cell phones are bought by individuals and SMS is the most common service used. Some micro loans have been used to buy cellular phones.

The expansion of Puskowanjati's communications strategies particularly connecting it's primary cooperatives to the internet where it is possible and training its staff and members in the use of ICTs can have a significant contribution in the delivery of its services. These services include training its members in the the areas of education, leadership, health, and management skills, providing information on health and enhancing is micro financing program increased accessed to market information.

A primary cooperative of Puskowanjati that has benefited from the use of computers is the **Citra Lestari Primary cooperative**. With over 3,500 members, Citra Lestari is a primary cooperative which started a micro credit program in 1991. In addition to the micro credit, it also operates a cooperative retail store, where members can sell their products. With regular meetings among its members and a global meeting every semester, Citra Lestari has successfully implemented a large micro credit program with currently 162 coordinators managing the credit system. Members include small entrepreneurs, construction workers, catering businesses, farmers, etc. Micro loans have been used for business improvement as well as household expenses, such as education, renovations, purchase of appliances, and--in a number of cases--computers and cellular telephones.

As a cooperative, Citra Lestari has invested in ICT by acquiring computers to assist in the maintenance of the cooperative retail store inventory, as well as to better manage the micro financing program information and details. The organization staff includes women trained with computer and accounting skills.

D. Gender mainstreaming within the government: the case of the Ministry of Communications and Information Technology and the Ministry of Women's Empowerment

201. In 2000, a Presidential Instruction on Gender Mainstreaming in National Development was issued by the Indonesian national government that instructed all “departments and non department government agencies, provincial and district governments to implement gender mainstreaming in planning, implementation, monitoring and evaluation of all development policies and programs”. According to the Ministry for Women's Empowerment, the body tasked to oversee the Indonesian government’s gender mainstreaming efforts, the country’s development approach at that time had not specifically considered development benefits for men and women equally, inadvertently contributing to gender inequality and inequity. In its technical guideline for implementation, the Ministry went on to say that, “gender inequality in various development sectors is indicated by lack of opportunities for women to work and perform business, and their low access to economic resources such as technology, information, market, credit and capital.” An aggravating factor that contributes to this condition of inequality is the lack of participation and involvement of women in decision-making in public policy demonstrated by just 7% representation of women in the top echelons of the national government executive.⁴⁶ Prioritizing gender mainstreaming within government institutions responsible for information and communication is a key component in engendering national ICT policies and programs that will be critical for rural women.

Gender Mainstreaming in MCI

202. MCI’s initiatives that respond to gender issues have focused on two initiatives, gender mainstreaming within the Ministry and a socialization project that aims to empower women in using ICTs. To follow up on the Indonesian government’s gender mainstreaming policies, MCI issued Ministerial Act No. 31/Kep/M.Kominfo/8/2002, to form a gender mainstreaming team within the ministry. The team’s main task is to ensure gender mainstreaming within the “telecommunication and communication society through mechanisms such as mass media, digital media, etc.” The main aim of the Ministry’s gender mainstreaming efforts is to ensure that men and women participate in all development activities and have equal access to the benefits derived from information and communication technologies. With the formation of the Ministry of Information and Communications Technology on February 7, 2005, the Ministry intends to conduct a training session on gender mainstreaming for all new managers as well as decision makers and policy makers. Gender mainstreaming in its programs and projects needs attention and will be a challenge for the new Ministry.

203. The Ministry for Women's Empowerment identified two areas to strengthen in the MCI’s gender mainstreaming program. The first is in providing a comprehensive report of its gender mainstreaming program and initiatives to make monitoring more effective. Secondly, it emphasized the need for high officials from the Ministry, with significant decision-making portfolios, to participate in high level monitoring meetings that the Ministry of Women’s Empowerment calls twice a year. MCI officials who are tasked with gender mainstreaming functions have indicated commitment to increasing efforts to cooperate with the Ministry.

⁴⁶ Ministry of Women’s Empowerment, “Technical Guideline for Implementation of Presidential Instruction Number 9 Year 2000 on Gender Mainstreaming in National Development, Second Edition, Republic of Indonesia, 2002.

Currently, MCI has one significant project that focuses on women empowerment through facilitation of access to information (see Box 5.5).

Box 5.5 Women’s socialization to ICTs

In 2004, MCI initiated one project that aims to increase women's socialization to ICTs. This includes four 2-day regional training workshops where women's leaders, government workers, religious leaders and spouses of government officials have participated.

The training was done in several provinces: West Jawa Province and DI Yogyakarta in 2003 and West Kalimantan and East Jawa in 2004. Additional workshops are planned for the provinces of South Kalimantan Province and North Sulawesi in 2005.

Total participants in each province for the training of women empowerment through ICT is 60 come from various institutions and organizations as shown in the table below:

Participants	No.
Women NGOs	6
Dharma Wanita	6
Women Business Group - IWAPI	6
Women’s Movement - PKK	6
Women Journalist	6
Employees at the Local Gov Office	6
Women’s Cooperatives	6
Education Leaders	6
Religious Leaders	6
Others women organizations	6
Total	60

Ministry of Women’s Empowerment: finding its way through ICT

204. ICT has not figured prominently in the Ministry of Women’s Empowerment’s technology focus. The Ministry’s direct involvement in ICT is limited to two areas: first, in relation to it’s gender mainstreaming oversight of MCIT and second, through a pilot project, also implemented in cooperation with MCIT. The project has been operating for 2 years but is limited at the district level and does not reach the rural areas. The information provided in this project is mainly agriculture related (i.e related to food production). The Ministry is proposing to expand this project to sub-districts. The ministry has also indicated the need to expand its own use of ICTs to enhance its own work, in relation to facilitating reporting mechanisms, using online tools to facilitate communications with other government departments and other partners and the use of web-based information for promoting women’s empowerment programs within the country.

205. Currently the Ministry has set indicators for gender equality largely based on human development indices, gender empowerment measure and those set through the Statistics Department of Indonesia. In addition to these indicators, the Ministry is planning to develop indicators in line with the 12 critical areas of the Beijing Platform for Action. This may be positive for ICT since Section J of the Platform refers to recommendations on media and ICT.

206. It is crucial to frame the objectives of any ICT policy and program within the framework of the Millennium Development Goals (MDGs). The following strategies for engendering rural information systems are closely tied with development goals of the country in relation to gender equality and empowerment of women.

A. Facilitating rural access through community access centers

207. The deployment of adequate ICT infrastructure in rural Indonesia is of high priority. There is ample evidence both from Indonesia and around the world that ICT are a powerful tool for development, however, about 65% of the Indonesian population has no access to ICT services and consequently have not had the opportunity to reap any of the potential benefits afforded by the technology. It is therefore clear that, if ICT are to make a valuable contribution to rural development, infrastructure needs to be in place to guarantee that access to affordable services becomes a reality (see the chapter on infrastructure in this report for a comprehensive discussion of the current status of access in rural areas). From a gender perspective, and recognizing that women make up a significant majority of the rural population in Indonesia, it is critical that any infrastructure development policy and program consider the following:

- That gender analysis be integral part of any policy and program design and that it be clearly aware of gender considerations for implementation purposes (for example, in defining proposed funds disbursement criteria, or in establishing program policies to promote women's ownership of productive resources, among others); and
- That policies and programs need to reflect a long term commitment to gender equality in all aspects of ICT policy development, through, among other things, ongoing monitoring and impact evaluation efforts that can document and assist policy makers in ensuring that Indonesian women, particularly poor rural women, are given equal and affordable access to ICT.⁴⁷

208. There is a great opportunity to ensure that the country's rural ICT policy and programs be properly designed from the initial stages of the process, by integrating gender equality goals and objectives at all levels of development. Indeed, Indonesia could become a model in the region, and the following recommendations, together with others suggested in this study, provide guidance as to how to approach these efforts and achieve tangible results.

Opportunities for infrastructure deployment

209. Rural areas are generally considered high costs areas to serve (with associated lower returns). In addition, low incomes limit potential demand and consequently the size of the market. Although fixed telephone lines are still a generally preferred communication method, the rapid expansion of cellular telephones demonstrate that demand for communication is high, continues to increase, and that, when affordable communications services are available (e.g., SMS), demand and use grow quite rapidly, including in rural areas.

⁴⁷ The Gender Evaluation Methodology (GEM) for ICT initiatives is a resource for ICT practitioners can be used for this purpose. GEM has been tested in 27 ICT projects in over 19 countries in Africa, Asia, Central and Eastern Europe and Latin America in projects such as community telecenters, education and training initiatives for women, employment projects, networking and community building projects and women's ICT media, information and advocacy projects. APC WNSP Gender Evaluation Methodology www.apcwomen.org/gem

210. As reported in Chapter I, there are a number of technology options (e.g., affordable broadband IP platforms) and key policy issues that must be addressed to facilitate infrastructure deployment in rural areas. Nevertheless, specific actions and policy decisions must take place to ensure that women and some men are not left without access to ICT. In fact, unless policy makers make a clear commitment to rural ICT development, universal access will never be a reality in rural Indonesia. The following recommendations address those concerns.

211. Community access centers are essential to facilitate rural access to ICT and must be a top priority for Indonesia's rural development strategy. Low incomes and limited infrastructure provide the perfect scenario for the development of community access centers (or telecenters), where rural populations can have access to an array of ICT services (including community radio, TV, videos, telephones and the internet) at affordable prices or even free of charge. Community telecenters offer great opportunity for women in rural areas, particularly if they are located in strategic locations and managed on a gender sensitive basis. For example, centers should: be managed and run by teams of women and men from the community, provide appropriate training for women in the use of ICT, provide content that is relevant to women's lives, and provide subsidized, low cost or free of charge ICT services. By focusing on community access solutions, it is critical that a rural development strategy recognize that there will always be a significant percentage of the population, particularly in rural areas, that will not afford to pay for ICT services. In these circumstances, access should be subsidized and never denied. It is important to facilitate access accompanied by a strong capacity building program, where users are made aware of the benefits of all ICT, trained in the use of the technologies, and provided continuing support in the development of their own ICT related activities and uses. This will strengthen demand and gradually decrease the need for subsidization. (Box

212. Lessons from evaluating the experience of Warnets in the country are valuable and should also be used to develop a telecenter program that addresses access from a gender perspective. Such program should consider, among other things:

- Support the development of a network of telecenters to provide community access to ICT, by providing initial capital financing, facilitate provision of donors contributions, and developing a telecenter implementation plan to guide implementation of the project initiatives.⁴⁸
- Ensure that such issues as location, ownership and management (i.e., 50% of owners and/or managers are women, women community organizations, or organizations committed to gender equality), marketing efforts and services are developed to address the specific needs of women in the community (i.e., start by surveying the community). Such services can include capacity building activities and business support services to assist rural women operating micro and small businesses.
- Make policy provisions that allow for the establishment of community tariffs or discounted tariffs for non-profit centers to provide affordable services to the community.

⁴⁸ The Telecenter Implementation Plan in South Africa, used by the Universal Service Agency in the implementation of its telecenter program, is a good tool and resource.

Box 5.6. Community Telecenters – Beyond Access: Beyond generating new jobs for women, ICT are being used in projects that address other gender and development issues related to poverty reduction. For instance, projects in South Asia that focused specifically on income generating activities and direct employment benefits for women created a space for information exchange, provided support networks and developed a range of interrelated social, technical and economic skills. Participants acquired the confidence for autonomous activity that made a significant contribution to their empowerment. Although ICT have not yet had significant impact on creating employment and generating income for very poor and marginalized women, there is potential through increasing their engagement with ICT to expand social networks and introduce new modes of learning which can play a key role in overcoming poverty in the future.

Nabanna is a project located in Baduria, in West Bengal, India. Women in Baduria did not have structured local communication networks that promoted access to information or provided spaces for sharing information and knowledge. Many of the women involved in the project report that they have gained more respect in their local communities as a result of the ICT skills learned at the Baduria ICT centre – both learning to use a computer and accessing and distributing information to local people. This has resulted in greater respect at both family and community level. Younger women feel they are able to approach the job market with greater confidence. There has also been an emergence of solidarity - since women learn to use computers together at the ICT centre, they also often discuss their problems, creating a sense of unity among them and also bringing forth inherent and latent leadership qualities.
<http://www.bellanet.org/leap/docs/136121e.pdf?OutsideInServer=no>

213. Despite the pressure for telecenter sustainability (which should indeed be a goal), it is important to recognize income limitations and therefore allow for such a program to benefit from a number of resources, such as the rural development fund (or universal access fund), universal service obligations and “output-based-aid” (OBA) approaches to development. As discussed in Chapter I, the World Bank’s experience with OBA projects in Latin America and most recently in Africa and Asia has been positive and offers a good model for Indonesia. However, we recommend that any approach used be thought through from a gender perspective and consequently allow for a gender analysis of the proposed plan. For example, minimum subsidy auctions tend to focus only on the amount of subsidy requested and potential population reach. While this may be important, it is absolutely critical that the organization or institution who is awarded the subsidy have a gender policy in place that relates both the operation of the organization and its service provision plans (i.e., plans that ensure targeted efforts to facilitate women’s access to services). The ITU has developed a set of gender aware licensing guidelines that can be used for reference.⁴⁹

B. Strengthening Content Development

214. Experiences in many countries have indicated that reaching women, particularly in rural areas, in developing countries is facilitated by using multiple forms of media and communications technologies. Investment in content development at the local level based on local information needs is also a key to facilitating more women’s access and relevant use of ICTs. The findings of this study revealed that there is a lack of relevant information that supports women’s productive roles in agriculture in the local language.

215. Greater attention should be paid to recognising women and the poor as information

⁴⁹ <http://www.itu.int/ITU-D/gender/pdf/GenderAwarenessGuidelines.pdf>

producers, providing relevant training in collecting, packaging and disseminating local knowledge, ensuring that new technologies, such as the computer and Internet, are combined with technologies that reach more women, especially in rural areas, such as radio and print. The provision of relevant local language content, via affordable and easy to use technologies that are accessible to an audience with few or no reading skills, is crucial if ICTs are to meet the needs of women in rural areas of Indonesia.

216. A rural strategy must look at community radios as major sources of information, and in many cases the only source on information in local languages available to illiterate populations, many of whom are women. Supporting and strengthening the role of community radios that makes use of digital technologies and the internet is a key strategy in combining use of more accessible communications technologies. Below is an example of an innovative initiative that is bringing community radio to women in rural communities in Fiji.

Box 5.7 Fiji Suitcase Radio

FemLINKpacific (Media Initiatives for Women), a women's community media in Suva, is pioneering a community radio project using mobile suitcase radio equipment with a 100-watt transmitter. FemLINK trained young women in secondary schools as its broadcast team. The first broadcast in May 2004 coincided with the International Women's Day for Peace and Disarmament. This radio project is a proactive response to the commercialization of radio waves in Fiji that resulted in a loss of space for women who wish to raise their issues, in their own way, in their local communities. The mobile radio project hopes to steadily address these gaps in information to and from women in rural communities, especially to strengthen women's participation in decision-making, and the overall peace process for Fiji.

SUVA (*Fiji Times Online/Pacific Media Watch*): The inaugural Fiji broadcast of fem TALK has been aired live from Saint Joseph's Secondary School, the Fiji Times reports.

<http://www.fijitimes.com.fj/story.aspx?id=2288> &
<http://lyris.spc.int/read/messages?id=31083>

217. In Indonesia, the community radio of Kamal Muara, a sub district in West Jakarta with 4600 households, demonstrates the power of this medium in communicating locally relevant content in a community setting. It is also an excellent example of an initiative that relies extensively on community resources to keep it going (see also annex).

218. The proliferation of "community radio" is new in Indonesia. Previously, they mostly operated as hobby-based, local, or simply "illegal" radio programs. Since the enactment of Indonesia's Broadcasting Law #32 – 2002, which acknowledges of community broadcasting that is limited in power and broadcast radius, many of these community radio initiatives have adopted a community service orientation.

219. Efforts aimed at building networks and collective strengthening among community radio initiatives are increasing with the establishment of the Indonesian Community Radio Network (Jaringan Radio Komunitas Indonesia) in 2002, a federation of provincial community radio associations. Some provinces, such as West Sumatra and South Sulawesi, recently had their association's first conference.

220. Community radio initiatives that are affiliated with the national network are estimated to be in over 500. For example, West Java and West Sumatra each has registered membership of about 40 community radio initiative while Central Java has around 30. Community radio

initiatives that are not affiliated or registered with the network are estimated to number over 1,000.

221. Community radio initiatives are normally found in rural and isolated areas, especially where no or very few commercial broadcasting is available and are thus, particularly well-suited for reaching out to women in these areas. They are mostly motored by hobby groups, and run by a coalition of volunteer core groups and community members. Being a community radio model means that they are "owned" by the community, and they are expected to be accountable to a multi-stakeholder community (village) broadcasting body.⁵⁰

Box 5.8 Rural Community Radio Initiatives in Indonesia

The list below documents the value that community radio provides through citing actual services of specific programs in various parts of Indonesia:

- They provide entertainment not normally provided by commercial radios, such traditional music and (oral) theatre.
- Almost all radio stations provide a medium for community messages to each other (whose baby is born today).
- They provide a check and balance to the local government by announcing what the village government is doing, what projects are ongoing, which families will get which development aid, and similar information (Most prominently Angkringan in Jogjakarta).
- Almost all help local government with their programs, some radio programs in Lombok, West java, Central java, and Aceh are now working with the World Bank to monitor the loan programs.
- They build community cohesion through live talk shows and facilitating phone in/text message comments from community members, government officials.
- They provide services for the community. A radio program in Lombok allows the use of their bank account for remittances from migrant workers abroad to their families who don't have their own bank accounts.
- They help connectivity and communication outside of the village. A radio initiative in Central Java broadcasts messages to from villagers working in Jakarta to their families in the village.

222. It is important to prioritize the development of appropriate content (especially for women) and capacity building initiatives as critical to the development of ICT in rural areas. The case study of the community training center in Sukabumi is a good example of how capacity building in the use of computer skills among women in a community has led to the production of content that are clearly addressing the development needs of the community.

223. For rural women in Indonesia, one critical information need is in the area of labor migration. Labor migration is associated with increasing vulnerabilities for women, including trafficking, violence and sub-normal working conditions. Migrants' income is often significantly reduced when they are forced to pay illegal fees to agents, facilitators and immigration authorities. Women enter informal services such as domestic work, or commercial sex industry more than men, and are more vulnerable to isolation, abuse and

⁵⁰ Mulya Amri provided the information on the status of community radio in Indonesia through an email interview.

trafficking, particularly in East Asia, which accounts for one third of the global trafficking trade (World Bank 2004c).

224. Latest figures from Indonesia (2004) indicate that while there are more males registered formally as migrant workers (5,000 females and 100,000 males) women far outnumber men in informal labor migration with a staggering 350,000 females compared to an estimated 15,000 males. Informal migrants have the least access to information about destination countries, labor contracts, workers rights and where and how they can communicate with their families, embassies and organizations that can assist them. This makes them extremely vulnerable to abuse.

225. Findings from an ongoing World Bank study on female labor migration in the country estimates that out of about 1 million Indonesians who work abroad annually, 80% are women. Around 90% of these women are working in the informal sector and are not documented. According to the study, these illegal migrants are statistically “invisible” and suggest that this information can be recorded at the village level. The research team found, through focus group discussions, that the community, especially the village councils, understood the importance of these statistics. What they lack are know how and tools to collect records of the incidence of migration within their villages.

226. The most common source of public information in the villages included in the study is television. Villagers do not have access to newspapers. Almost all the household that we interviewed owned a TV set, but very few had radios. Only very few households have fixed telephone lines. Usually, a wartel or public telephone kiosks can be within the village. The study observed that wartels mushroomed in the villages because of the growing demand from the villagers. Wartel owners sometime play the role of "interpreter" for the migrant families by dialing up the destination number and asking (in Arabic or Mandarin or English) to speak to the women migrant working in that household. Households who owned fixed lines also "share" their phones with others in the neighborhood to contact family members who are working overseas.

227. Interviews with the villagers revealed that they knew very little about the process of migration and the possible difficulties and abuses that they need to avoid. The study points out that apart from brochure/flyers, what the villages badly need is a ‘user friendly facility’ that can help provide critical and accessible information at the village level.⁵¹

228. The challenges in communication and information is vividly seen in the example of Ngandong, a village in Wonogiri, C.Java. The village council provides proactive information about the dangers of trafficking through a community bulletin board. Printed information is posted near the village council office. While the information raises awareness of possible dangers that migrant women may face, this initiative clearly lacks the ability to assist women who may already be in vulnerable situations. A strategy that can connect villages where migrant workers come from (such as Wonogiri) to community telecenters may be able to provide the critical link between families and workers both domestically and overseas. These telecenters can also provide much more up to date information about the migration process, workers’s entitlements, organizations that can provide assistance, etc.

⁵¹ The information from the World Bank study was provided by Chitra Buchori and SH Ningsih who are both in the Bank’s research team.

C. Supporting rural women's cooperatives as potential rural service providers

229. The cooperative movement is not new and it is indeed well established in Indonesia. The government has supported and strengthened the network and there is a Ministry for Cooperatives. With approximately 1,300 active cooperatives and over 360,000 members⁵², the network of women's cooperatives is strong, has an expanding presence, and has demonstrated its ability to manage and implement large scale programs to benefit poor rural women and their communities, particularly through micro-credit lending schemes. As presented above, some of the regional cooperatives have now engaged in ICT projects to train their members in the use of computers and the internet. In spite of the fact that these projects are new and evolving, they are already in great demand and have accomplished much in the short term.

230. The women's cooperative network in Indonesia offers great opportunities and could very well become a critical player in the provision of effective and sustainable ICT access and related programs (capacity building, improved micro and small business support services, among others). The case of Puskowanjati is encouraging and other women's organizations in Indonesia may also have established similar programs. The experience of the Self Employed Women's Association (SEWA) in India, which has provided access to ICT to its members as well as an array of ICT related tools, services and capacity building programs, illustrates the potential when women's organizations are supported to develop and implement these types of activities. (Box 5.9)

Box 5.9. Self Employed Women's Association (SEWA), India

SEWA, India, is a member-based organization of poor informal sector women workers. Two-thirds of their members live in rural areas and are home-based workers, vendors, manual laborers, service providers, and producers. SEWA's ICT unit has been exploring the use of ICT as a tool to increase the efficiency of rural micro-level enterprise activities to secure poor women's livelihood. SEWA has successfully taken an integrated and holistic approach to the use of ICT for rural development, such as providing its members with access to information; training them with communication tools and customized software; technical training on repairing their tools; generating job opportunities; and also by providing child care and health care. Some of their current activities on ICT include:

- Imparting basic computer training for semiliterate women before they are introduced to communication tools such as Internet and customized software for their micro-enterprises,
- Providing technical training such as maintenance and repairs of their tools,
- Providing loans for mobile phones for informal sector workers, i.e. vegetable vendors,
- Providing health advice and nutritional information by linking with hospitals via video conferencing for villagers who are laborers and service providers who do hard physical work to earn a living and survive, i.e. construction workers and salt workers, and
- Exploring various partnerships with different medical institutes and organizations for providing better access to health care services for its members, i.e. telemedicine.

Source: Financing ICTD: a review of trends and an analysis of gaps and promising practices, the report of the Task Force on Financial Mechanisms for ICT for Development, UNDP, December 2004, citing Dhara Patel, Coordinator, ICT, Self Employed Women's Association (SEWA), India, presentation at the World Bank, July 2003. <http://topics.developmentgateway.org/ict/rc/ItemDetail.do~356172>.

⁵² Data provided by the Ministry for Cooperatives. Women's cooperative's data for the year 2000.

231. This is particularly important in the rural context where cooperatives have an established presence and in many cases the ability to expand into rural service providers. This is exactly what happened in countries like the US, Bolivia, Peru, and Poland (Box 5.10), where rural cooperative became involved in the provision of telecom network services, particularly by connecting rural populations to the nearest backbone access point. The experience with community owned networks has been impressive and owes its success to community ownership and its not-for-profit model of operation. In the US, for example, close to 1,000 rural cooperatives still operate and depend on universal service funds to run their operation (i.e., the cooperatives receive universal service subsidies to ensure proper broadband access in their rural service area).

BOX 5.10 Cooperative Networks in Poland

In Poland in 1991, two pioneering local cooperative networks, WIST and Tyczyn, were joined by numerous private-investment local networks, which meant they were directly comparable. However, many of the private networks found that they could not offer the level of return demanded by their investors and were forced to sell, sometimes at a loss, to the national telecommunications provider. According to a comprehensive review in 2003:

“Unlike investor owned companies, [the cooperatives] were able to build out their systems, pay off their loans rapidly, and prosper while many investor-owned systems - dependent on outside capital and profit, rather than service as their motivation – have been less successful or failed. A critical element in the success was their community ownership. (NTCA 2003 p14)

Both cooperatives grew by means of both extending into unserved areas and poaching customers from the state provider TPSA using incentives such as immediate repairs as against the weeks or months it took TPSA. The cooperatives also boosted revenues and clients through household enterprises, farm processing and businesses attracted business relocating into the service area, underlining the importance of a good quality, reasonably priced and responsive system to business development. The cooperative are credited with having given a major boost to business as a whole.

But the spin-off benefits were also important.

“The projects proved the importance of telecommunications for community strengthening and local economic development. In both cases, their success resulted in the formation of relationships among local mayors and *gminas* [county] that lead to other important public services, including wastewater treatment and household natural gas networks. The cooperatives spurred enterprise development, helped in the formation and success of a credit union and large dairy cooperative. (p15)”

Source: *Financing ICTD: a review of trends and an analysis of gaps and promising practices*, the report of the Task Force on Financial Mechanisms for ICT for Development, UNDP, December 2004, adapted from case study on the cooperatives,

http://www.ntca.org/ka/ka-3.cfm?content_item_id=1599&folder_id=324 and

<http://www.coopdevelopmentcenter.coop/CDP%20case%20studies/NTCA%20Case%20Study.pdf>

232. The Bank recommends that MCIT should consider supporting a selected number of genuine grassroots rural women's cooperatives to expand their activities to the provision of telephony and ICT services in their areas. MCIT can work in collaboration with the Ministry of Cooperatives and the women's cooperative regional offices to develop a pilot plan and facilitate implementation. Based on the results, the MCI could then ensure that its universal access fund or rural development fund appropriately allocates resources to these cooperatives.

D. Developing strategies to integrate gender mainstreaming in National ICT policies, programs and projects

233. Engendering Indonesia's National E-strategies is the key in ensuring that gender equality goals are embedded in ICT policies, programs and projects in the country. A basic starting point for incorporating gender perspectives in ICT initiatives is the use of gender analysis to ascertain the needs and priorities of both women and men and how policy-making, planning and other activities can support equitable access, use and benefits of ICTs. Improved processes of consultation and participation need to be developed and more women should be involved at decision-making levels. MCI and the Ministry for Women's Empowerment are the key institutions that can make this happen and increased collaboration between them can potentially broaden the involvement of more women's organizations and gender advocates in ICT for development initiatives.

234. Gender mainstreaming should be strengthened within the MCI with the view of integrating a gender perspective in the Ministry's strategies. The reorganization of MCI presents a good opportunity to appoint a high-level gender focal point with decision-making authority within the Ministry. Additionally, it is also necessary to introduce gender mainstreaming across the board to build the Ministry's capacity to ensure that all its policy and programs address gender considerations, that policy makers are able to identify projects that benefit women and other unserved groups, and consequently to increase the MCI ability to expand and improve on projects that have greatest impact (i.e., projects that facilitate access to women,, and that contribute to improved content development, education and capacity building, and governance. The Ministry can further strengthen its capacity by training project developers and implementers on gender analysis and therefore ensure the integration of gender in the design and implementation of its projects.

235. Gender concerns have to be dealt in initial stages of ICT projects to ensure that the needs and priorities of both women and men are appropriately considered and that gender equality goals are embedded in project design. In a study done by World Bank in 2002, 53 of 80 ICT projects concluded that gender issues were rarely articulated in product design and implementation, often because donors do not request this. The study underlined the need for a proactive approach to ensure gender-balanced participation, particularly in projects in developing countries, because of the limited pool of women with skills in this area. The study also indicated that project implementers should take into account the context of gender

⁵³ Hafkin, Nancy. 2002. "Are ICT gender neutral?", Lead report for United Nations INSTRAW discussion list on gender and the digital divide. Available online at: <http://www.un-instraw.org>

relations in ensuring women's full participation to avoid backlash from other members of the society. Involving all stakeholders of the target community, including both men and women, in project design from the beginning, is imperative.

236. Broad gender mainstreaming guidelines for ICT projects are beginning to be proposed by a number of organizations with the intention of influencing project design and implementation. The guidelines build on the well-developed gender planning and gender mainstreaming tools that are now commonly utilized in different sector areas. Examples of such guidelines can be found on http://www.bridge.ids.ac.uk/reports_gend_CEP.html#ICTs

237. Collection of sex-disaggregated data that will serve as baseline information in ICT for development. While the gender digital divide is recognized in Indonesia's national e-strategies, there is still a paucity of data that will help the Ministry and other policy makers to develop ICT policies, plans and strategies that take into account gender considerations. According to the MCI, the absence of sex-disaggregated data in terms on access, education and other aspects of ICT use, is a barrier that makes it difficult to gauge the seriousness of the divide and shore up arguments for projects, programs and policies that specifically target women.

238. A recommendation that has been taken up in many international conferences including the World Summit on the Information Society is to increase efforts to compile statistics disaggregated by sex and age and to develop gender-specific indicators on ICT use and needs. Currently, the only area where International Telecommunications Union (ITU) collects sex-disaggregated Telecommunications/ICT statistics is the employment of women by telecommunications service providers.⁵⁴ While it is valuable to know that women comprise the majority in telecommunications companies, it does not take into account the type of work that women are engaged in and whether women have penetrated the higher-income, highly-skilled and decision-making positions.

239. In a recent meeting, ITU recognised that it is important to go beyond the numbers of women and men employed, to documenting the posts they hold and analyzing changes over time. ITU has recently embarked on a project to compile and analyse quantitative and qualitative gender-sensitive information from national and international sources. This information, which includes developed and developing countries and which could eventually be compiled into a database, will provide an important source of gender-disaggregated ICT statistics.⁵⁵ MCI can work with ITU in the collection of data in Indonesia.

240. Strengthening collaboration between MCI and the Ministry for Women's Empowerment. Both Ministries will benefit immensely through closer collaboration in program design, implementation and monitoring and in human resource development. Such collaboration can focus on developing gender indicators for ICT programs and projects, collection of sex-disaggregated data on selected indicators and building the capacity of all government bodies involved in the country's ICT for development program in gender mainstreaming. A consultation of women's organizations and focal point representatives of a

⁵⁴ Hafkin, Nancy (2003). "Some thoughts on gender and telecommunications/ICT statistics and indicators", 3rd World Telecommunication/ICT Indicators Meeting, Geneva, 15 - 17 January 2003. http://www.itu.int/ITU-D/ict/wict02/doc/pdf/Doc46_Erev1.pdf

⁵⁵ Key points highlighted in the World Telecommunication/ICT Indicators Meeting, Geneva, 10-11 February 2005, p. 10. http://www.itu.int/ITU-D/ict/wict05/Conslusions/Conclusions_Final_WTIM05.doc

number of government bodies held to solicit input for the study recommended that a mapping of gender and ICT initiatives in the country be done. A specific recommendation arising out of discussions with both Ministries supports the holding of a workshop on “Engendering National ICT Strategies” for the concerned government bodies and other stakeholders (such as women’s organizations, media groups, research institutions and relevant academic institutions). This can lead towards the formation of a gender and ICT for development network of focal points that can serve both as a monitoring as well as a forum for knowledge sharing on good practice.

Box 5. 11 Gender mainstreaming in Korea’s efforts towards an information society

The Korean Ministry of Gender Equality has developed a basic plan for women’s informatization (2002-2006). This plan includes creating a Women-net; establishing a volunteer network to increase women’s access to information, retraining working women in IT occupations with high employment potential and providing professional online IT education for women; and supporting women’s organizations in promoting the national IT sector. The Ministry of Gender Equality has worked with other ministries, including the Ministry of Information Technology, to facilitate gender mainstreaming activities and various relevant ministries have allocated budgets for women’s IT education.

Source: Information and communications technologies and their impact on and use as an instrument for the advancement and empowerment of women, Report of the Expert group meeting, UN-DAW, Seoul, Korea, November 2002. <http://www.un.org/womenwatch/daw/egm/ict2002/index.html>

Korean work on gender and ICT statistics

Few countries collect gender ICT statistics, and those that do, are the ones where the gender digital divide is least marked. Some of the most interesting and substantial work in gender and ICT statistics is coming from Korea. In 2001 the Ministry of Gender Equality released a research report on “Women’s Informatization survey and index development” examining the gender digital divide in Korea. The Ministry based their research on five categories, from which they developed an index of women’s “informatization” defined as the process by which information technologies have transformed economy and society. These categories are *awareness, access, utilization, skill* and *effects*. The index measured involvement of men and women according to the categories and then measured the comparative informatization by sex. The results showed that women’s informatization measured 88 percent that of men’s. Although women scored very high on awareness, skills and effect, in terms of access and usage, the situation of women was particularly deficient, with women having only 22.9 percent the access of men and using the Internet of 28.2 percent as much as men. Among the findings was that there is a serious digital divide by age, with women’s scores on all categories in the index dropping with age (measured in decades, starting with those in their twenties) and a serious gap apparent for those in their fifties and older. Not surprisingly, higher income women had a higher rate of informatization than those with lower incomes.

VI. The Way Forward

241. ICTs are tools that offer great potential to transform the rural economy and society in Indonesia, as is already happening in other emerging markets. However, unleashing this potential requires both supply-side and demand-side approaches. On the supply side, major policy reforms need to be undertaken on the **infrastructure and regulatory aspects**. There is considerable international evidence that when there is a powerful incumbent (or a duopoly in the Indoensian case), facilities-based competition and asymmetric regulation are almost indispensable to break up the monopoly power to set prices and control the market. This was certainly Korea's and Chile's experience. It is a thorny issue in the case of Indonesia where the incumbent is 51% owned by the Government. Korea's first step, before promoting facilities-based competition, was to divest itself from its majority stake in the incumbent operator. In Indonesia's case, facilities-based competition will mean establishing VOIP solutions, satellite and wireless technologies but by independent as opposed to the duopoly operators or their subsidiaries. The government will need to rethink its majority stake in the dominant incumbent if it is serious about making a genuine effort to introduce facilities-based competition to bring down connectivity costs and improve rural access. On the regulatory side, empowerment of a truly independent regulatory body particularly for network connectivity and for enforcing interconnectivity arrangements will be essential. Transparency and a level playing field are prerequisites to getting more operators in the sector ultimately driving down costs and increasing benefits to the end users.

242. Given its archipelagic nature, a **fibre/satellite backbone** must be an investment priority for the government if ICT is to be leveraged for economic development. This may well involve use of alternative fiber optics such as those of the railways, gas lines etc. The recent proposal at the Infrastructure Summit in January 2005 for the "ring of rings" project seeks to establish this backbone through fiber, satellite, and terrestrial wireless but this is only restricted to about 20 islands. The Government can facilitate and indeed stimulate rural access through creating a rural service provider category that works only in rural areas connecting villages with no license fee and no spectrum fee for fixed connections to a village. This could well be subsidized under the USO and could stimulate local SMEs into transforming themselves into such rural service providers. While a detailed cost benefit analysis of this was beyond the scope of the report, this concept merits further analysis and application.

243. However, technology alone is not the panacea. Ultimately ICTs are means not ends in and of themselves. In Indonesia, successful examples of ICT applications in rural communities are scarce. Little wonder that rural communities are not convinced how ICTs can help improve their lives. On the demand side, there is a **need for clear demonstrable models of success** for how to make information work for farming communities for instance. For example, when farmer groups were queried as to the usefulness of up-to-date market price information, most indicated that this would be of little use, and preferred access to an "introduction" service to buyers whom they could trust, because without the personal relationship with the buyer, crop prices based on statistical averages were perceived to be of little use. Farmers need to be convinced of the value of information and for agriculture end-to-end services – from inputs, credit, expert advice, loan repayment, transport, marketing – all need to come together in order to provide a bouquet of services that is perceived to be

useful by farmers. A partial approach is ineffective at best, and counterproductive at worst contributing to a distrust of ICTs in general. ICT applications such as agricultural commodity market information systems, online research and extension, government to business services for small and medium enterprises, educational content etc. can be developed on the back of more extensive communications infrastructure, and will also help to aggregate demand and thus pay for the cost of infrastructure

244. Bridging the **gender divide** is all the more important in rural areas because of the significant role that women play in decisions about the allocation of household resources in Indonesia. This is also strongly reinforced by prevailing cultural attitudes concerning the reputation of women for economic acumen, thrift and foresight, and trustworthiness in putting family interests before their own desires. Nonetheless, women also need to be convinced of the merits of ICTs. Experience from India shows that health, livestock and education and most importantly, employment-related information are of key concern to rural women.

245. Experiences in many countries have indicated that reaching women, particularly in rural areas, in developing countries is facilitated by using **multiple forms of media and communications technologies**. Investment in content development at the local level based on local information needs is also a key to facilitating more women's access and relevant use of ICTs. The findings of this study revealed that there is a lack of relevant information that supports women's productive roles in agriculture in the local language. Greater attention should also be paid to recognizing women and the poor as information producers, providing relevant training in collecting, packaging and disseminating local knowledge, ensuring that new technologies, such as the computer and Internet, are combined with technologies that reach more women, especially in rural areas, such as radio and print. The provision of relevant local language content, via affordable and easy to use technologies that are accessible to an audience with few or no reading skills, is crucial if ICTs are to meet the needs of women in rural areas of Indonesia.

Public Expenditure Issues:

246. The USO program clearly will not be sufficient in and of itself for any new rollout in rural areas despite the recent Government Regulation No. 28/2005 which obliges telecommunications operators to contribute 0.75 percent of their annual gross revenues (minus provision for bad debts and interconnection charges) into a USO Fund to be administered by MCIT. The analysis in the report shows that for every 1 percentage-point of tax generates 491 billion rupiah in annual revenues for the universal fund (\$51 million at today's exchange rates). Assuming that a line costs 18.7 million rupiah (\$2000 per line at today's exchange rates) and that the fund is used to finance the entire cost of new lines, 26,238 new lines could be funded by the universal service program each year. MCIT estimates the total cost of USO provision is Rp 5.095 trillion or US\$525.3 million to 2009. The projected revenues from operator contribution is US\$196.4 million. The estimated financing gap would then be in the order of US\$329 million over the period. The tax would have to be around 4.48% just to keep pace with Indonesia's population growth rate (1.293 in 2003). But such a tax could reduce profits in the telecommunications sector by 4.48% or more, thus shutting off new investment in the sector.

247. While ensuring universal access is a desirable good, Indonesia will need to mobilize considerable resources for infrastructure investment. Clearly, sector revenues are not sufficient to cover these needs. Accordingly, the government needs to identify sustainable models for rural communications service delivery, through innovative partnerships with private providers, and deployment of low-cost technologies. In light of the government's stated priorities and the still very significant **access challenge** highlighted in this report, the importance of a partnership/leveraging approach is paramount: helping the government to use public resources to mobilize private capital more effectively for investment in rural access/connectivity in the short-medium term and as a platform for ICT applications (e.g. e-government) in the medium to long term will be critical.

248. In this regard, the Bank can work with the government to develop new options for rural telecommunications. These include deployment of appropriate new technologies suitable for poorly-served or underserved areas such as Voice over IP, VSAT, and wireless broadband. The Bank can also assist the government in developing competitive "output-based aid" (OBA) approaches: private-public partnership programs which allow the market to determine which operators will best provide services to specific high-cost areas that are otherwise uneconomic to serve. Competitive bidding for such subsidies also holds promise for the provision of schemes to increase affordability of bandwidth and to enhance small business development through multipurpose telecenters in rural communities, the development of content, applications, and training.

249. Through market forces alone the use of computers and the Internet will eventually reach a critical mass of micro-entrepreneurs and rural poor, and network effects will accelerate the process making it appealing for the majority of the rural and micro-entrepreneurial population to use the technology. But the process could take several generations. An important public goods issue that the government should consider to reduce the lag time, is the funding of **digital literacy campaigns** to train select low-income groups as has become part of national efforts in many countries to further ICT development and which are usually incorporated into broader ICT programs. Digital literacy program stimulate demand, and tend to be self-targeted, as high income people do not generally need ICT training. In Korea, Government carried out mass media informatization campaigns and established Education Information Centers in schools and post offices, used to provided free or low cost information education to an estimated 10 million people, mainly students, government staff, soldiers and housewives. As noted in Kenny and Utz (2000), there were two major factors behind Korea's rapid expansion in access to ICTs: a strongly committed government and increasing competition. The government's Cyber Korea plan, along with a number of other policy initiatives laid out an ambitious agenda to provide for the networking and knowledge needed in the new global economy. Chile's national digital literacy campaign (Gobierno de Chile [2004]) provides for digital literacy training of 500,000 people for the 2003-2005 period and had the backing of the country's President. The program runs in parallel with its telecenter program and includes digital literacy training to users of public library telecenter users as well as specific efforts directed at farmers. A similar program in a country with the relatively high educational achievements such as Indonesia could prove invaluable to dramatically accelerate the use of computers and the internet especially by government officials, micro-entrepreneurs, farmers, womens' groups, and grass roots organizations. This will require political commitment akin to the Korean and Chilean examples if it is to succeed.

Annexes:

1 - 10

**Annex 1:
Status of Fixed and Mobile**

	Korea			China			Malaysia			Thailand			Indonesia		
	2003	2005	Growth %	2003	2005	Growth %	2003	2005	Growth %	2003	2005	Growth %	2003	2005	Growth %
Main telephone lines per 100 inhabitants (2003)	53.8	59.7	2.9	20.9	31.8	5.5	18.2	16.7	-0.7	10.5	11.1	0.3	3.9	4.5	0.3
Mobile subscribers per 100 inhabitants (2003)	70.1	70.4	0.2	21.5	27.9	3.2	44.2	48.5	2.2	39.4	55.3	7.9	8.7	12.8	2.0

Note: 2005 data are projections from the ITU

Source: ITU

Annex 2: Tax Revenues for Funding Universal Service

The government defines “USO” very broadly as provision of access to basic telephony/internet/media services. Under this program, the government aims to ensure access to telecommunications (telephony/Internet/media) for 43,000 villages by 2010 on the basis of “one connection, one village”. The program was initially funded through the national budget (Rp 45 million in 2003 and in 2004). Selected operators were contracted to install connections. Initial results (measured against physical connection targets) are as follows:

- 2003: 3010 individual connections /villages established, 2975 using portable fixed satellite or PFS (PT Pasifik Satelit Nusantara) and 35 using VSAT (PT Citra Sari Makmur). In Sumatra, Java (Banten), Kalimantan and Eastern Indonesia.
- 2004: 2,620 individual connections in 2341 villages: 1,617 PFS (PT Pasifik Satelit Nusantara); 15 VSAT (PT Citra Sari Makmur); 386 point to point/multipoint radio (PT Telkom Drive 1 Sumatra); 314 CDMA fixed wireless (PT Mandara Seluler Indonesia), and 228 IP-based (PSN) in Sumatra, Java, Kalimantan and E. Indonesia.
- 2005 target: connection of a further 5025 villages using a combination of fixed-wireless access, CDMA wireless, radio, VSAT, IP and PFS technologies.

For 2006-2009 the government is mobilizing non-tax revenues to finance further connections. Under Government Regulation No. 28/2005, telecommunications operators are now required to contribute 0.75 percent of their annual gross revenues (minus provision for bad debts and interconnection charges) into a Universal Service Obligation fund administered by MCIT. The new USO program is expected to become effective in January 2006. This would increase the size of the budget upwards of Rp 400 billion annually. This will be a significant increase over previous years, but it has to be recognized that this measure alone will not provide the only source of funds for a new rollout in remote and rural areas, rather it would only provide some subsidy of investment costs in areas where the market will not go it alone. MCIT estimates the total cost of USO provision is Rp 5.095 trillion or US\$525.3 million to 2009. The projected revenues from operator contribution is US\$196.4 million. The estimated financing gap would then be in the order of US\$329 million over the period.

In the table below, revenues that would be generated by a 1% tax on the gross revenues of Indonesia’s telecommunication operators—PT Telkom, PT Indosat, and the cellular industry are estimated. Since interconnection fees are transfer payments between operators, the interconnection fees paid by each operated are netted out of gross revenues in order to prevent double counting.

**Financing Universal Service with 1% USO Tax Rate
(billion Rupiah)**

	Telkom	Indosat	Telkomsel	Excelcomindo	Total
Gross Revenue	27,116	8,235	11,150	2,590	46,501
Interconnection Fee Rate	40%	40%	10%	10%	
Interconnection Fees	10,846	3,294	1,115	259	15,514
Net Income	6,087	1,570	4,240	400	12,297
USO tax rate	1%	1%	1%	1%	
USO Revenues	271.16	82.35	111.50	25.90	490.91

Note: Only the two cellular companies have been accounted for in this table. Revenue data is from December 2003. Cellular interconnection fees are assumed to be 10% of gross revenues. Source: Revenue data is from Business Monitor International (BMI). Interconnection fee rates are from the Department of Communications and Information Technology.

Accordingly, every 1 percentage-point of tax generates 491 billion rupiah in annual revenues for the universal fund (\$51 million at today's exchange rates). Assuming that a line costs 18.7 million rupiah (\$2000 per line at today's exchange rates) and that the fund is used to finance the entire cost of new lines, 26,238 new lines could be funded by the universal service program each year. With some 9.1 million lines overall, this represents an increase of only 0.29 percent per annum for every 1 percentage-point of tax. The tax would have to be around 4.48% just to keep pace with Indonesia's population growth rate (1.293 in 2003). But such a tax could reduce profits in the telecommunications sector by 4.48% or more---thus shutting off new investment in the sector.

Annex 3: Survey of Users of 15 Warnets in Yogyakarta

Introduction¹

The tabulations that follow have been made from raw data available for 270 users of 15 Warnets in Yogyakarta, interviewed in November-December 2003.

The questionnaire respondents were all customers physically met in Internet cafés in Yogyakarta during November-December 2003. Game centres and university-owned Internet cafés were excluded from the sample.

The area of Yogyakarta city was divided into five geographical clusters based on main lines of demarcation. A north-south distinction was made using the railway as divider. The northern area was divided into three clusters and the southern into two, based on the main road partitions. In each cluster, three Internet cafés were randomly selected.

The number of venues for data collection thus became 15, which is 10% of the total number of Internet cafés in the city. In order to get the most realistic picture of Internet use, questionnaires were distributed at three different periods of time (morning = 08.00-12.00, afternoon = 13.00-17.00, and evening =18.00-22.00). Within each time period responses were collected from six Internet café users at each venue. The total number of respondents is 270.

The sample was drawn so as to obtain a similar number of respondents during each of the three time periods: morning (8 to 12 hours), afternoon (13 to 17 hours) and evening (18 to 22 hours). The survey did not try to estimate the rate of utilization of the warnets at different times during the day. Informed observers suggest that the rate of utilization throughout the day varies; and a rough guess might be: 15-20% utilization in the mornings, 35-45% in the afternoon and 60-70% utilization in the evenings. Accordingly, in practice, the survey sampled a proportionately higher rate of morning users, with respect to afternoon and evening users. Since teenagers (students) and women tend to have a higher use rate in afternoons and evenings (see Table A8), these groups may be underrepresented in the sample, as a result of the higher morning sampling rate.

The survey was carried out in connection with research under way by Kristiansen, S., Furuholt, B., Wahid, F. (2005), "Cyber cultural diversity: The use of Internet cafés in Indonesia", Working paper. School of Management, Agder University College, Kristiansand, Norway.

The questionnaire used is attached at the end of the ANNEX.

¹ This introduction was prepared by Fathul Wahid, of the Department of Informatics, Faculty of Industrial Technology, Islamic University of Indonesia, and one of the authors of the survey.

**Table A1. Socioeconomic Characteristics of Sample Users
of 15 Warnets in Yogyakarta**

Characteristic	Male		Female		Total	
	No	%	No	%	No	%
Gender						
Female	86	100%			86	32%
Male			184	100%	184	68%
No, of valid responses	86	100%	184	100%	270	100%
Marital Status						
Single	167	91%	83	97%	250	93%
Married	17	9%	3	3%	20	7%
No, of valid responses	184	100%	86	100%	270	100%
Age						
13-19	35	19%	10	12%	45	17%
20-29	115	64%	74	86%	189	71%
30-39	26	14%	2	2%	28	11%
40+	4	2%			4	2%
No, of valid responses	180	100%	86	100%	266	100%
Nationality						
Indonesian	182	99%	84	98%	266	99%
Other (2 Cambodia & 2 Japan)	2	1%	2	2%	4	1%
No, of valid responses	184	100%	86	100%	270	100%
Education						
Elementary	10	5%	2	2%	12	4%
Junior High	15	8%	3	4%	18	7%
Senior High	90	49%	48	56%	138	51%
Diploma III	17	9%	14	16%	31	12%
Bachelors degree	46	25%	18	21%	64	24%
Masters or higher	5	3%			5	2%
No, of valid responses	183	100%	85	100%	268	100%
Employment						
Student	126	69%	69	81%	195	73%
Entrepreneur	20	11%	5	6%	25	9%
Government employee	2	1%			2	1%
Employee in pvt. company	26	14%	7	8%	33	12%
Unemployed	8	4%	4	5%	12	4%
Other	1	1%			1	0%
No, of valid responses	183	100%	85	100%	268	100%

Source: Data from survey carried out by Kristiansen, Futurholt, and Wahid, 2005.
The survey was carried out in November - December 2003

**Table A2. Basic Features of Internet Use by Sample Users
of 15 Warnets in Yogyakarta**

Characteristic	Male		Female		Total	
	No	%	No	%	No	%
Experience using Internet						
Novice (Less than one year)	1	1%	6	7%	7	3%
Recent (1 to less than 2 yrs)	12	7%	4	5%	16	6%
Experienced (3+ yrs)	169	93%	76	88%	245	91%
No. valid responses	182	100%	86	100%	268	100%
Frequent Place of Use of Internet						
at home	12	7%	4	5%	16	6%
at work place	22	12%	8	9%	30	11%
at school/university	38	21%	26	30%	64	24%
at a Warnet	184	100%	86	100%	270	100%
No. valid responses	184		86		270	
Note: More than one place is a valid						
Language Used while Using Internet						
Indonesian						
0 - 25%	54	30%	11	13%	65	25%
21 - 45%	52	29%	31	37%	83	32%
51 - 75%	42	23%	24	29%	66	25%
76 - 100%	31	17%	18	21%	49	19%
No. valid responses	179	100%	84	100%	263	100%
English						
0 - 25%	39	22%	33	38%	72	27%
21 - 45%	61	34%	34	40%	95	36%
51 - 75%	32	18%	10	12%	42	16%
76 - 100%	48	27%	9	10%	57	21%
No. valid responses	180	100%	86	100%	266	100%
Other						
0 - 25%	20	91%	9	75%	29	85%
21 - 45%	2	9%	1	8%	3	9%
51 - 75%		0%		0%	0	0%
76 - 100%		0%	2	17%	2	6%
No. valid responses	22		12		34	
Note: More than one place is a valid						
Number of Uses of Warnet During this Session (at time of interview) *						
One use only	2	1%		0%	2	1%
Two to three uses	35	19%	24	28%	59	22%
Four to nine uses	106	58%	47	55%	153	57%
Ten to 15 uses	41	22%	15	17%	56	21%
No. valid responses	184	100%	86	100%	270	100%
Note: More than one place is a valid						

Source: Data from survey carried out by Kristiansen, Futurholt, and Wahid, 2005. The survey was carried out in November - December 2003

* Tables A3 and A4 give additional details with respect to the uses made of the Warnet.

Table A3. Uses of the Internet During the Session when Interview was Made by a Sample of Users of 15 Yogyakarta Warnets*

Purpose	No. of Respondents that Ranked a Service as being used during this session			Percentage of Respondents who Ranked a Service as Used during this session**		
	Male	Female	All	Male	Female	All
1 Search for information	173	83	256	94%	97%	95%
2 e-mail	163	75	238	89%	87%	88%
3 chatting	128	63	191	70%	73%	71%
4 Reading News Online	126	53	179	68%	62%	66%
5 Research	108	42	150	59%	49%	56%
6 Computer games	79	24	103	43%	28%	38%
7 Download of software for professional use	74	28	102	40%	33%	38%
8 Download of software for amusement	74	28	102	40%	33%	38%
9 Downloading music	67	28	95	36%	33%	35%
10 Visiting pornographic sites	63	11	74	34%	13%	27%
11 Doing business	54	19	73	29%	22%	27%
12 Other IT services	63	23	86	34%	27%	32%
13 Other non IT use	44	17	61	24%	20%	23%
14 e-shopping	38	14	52	21%	16%	19%
15 Gambling	33	10	43	18%	12%	16%

Source: Data from survey carried out by Kristiansen, Futurholt, and Wahid, 2005.

The survey was carried out in November - December 2003

* The question asked was: "What are you using the Internet Café for at this time? (Please rank relevant alternatives according to importance.)"

** The total number of survey respondents were 270; of which 184 were male and 86 were female.

Table A4. First Priority Use of the Internet by a Sample of Users in 15 Yogyakarta Warnets*

Purpose	Service Ranked by User as No. 1 Use During this Session			Percentage in sample (by gender) who Assigned Rank 1 to this Use		
	Male	Female	All	Male	Female	All
1 e-mail	78	38	116	42%	44%	43.0%
2 Search for information	56	28	84	30%	33%	31.1%
3 chatting	15	8	23	8%	9%	8.5%
4 Computer games	20	3	23	11%	3%	8.5%
5 Download software for professional use	7	6	13	4%	7%	4.8%
6 Research	9	3	12	5%	3%	4.4%
7 Other IT services	7	4	11	4%	5%	4.1%
8 Reading News Online	5	4	9	3%	5%	3.3%
9 Doing business	5	3	8	3%	3%	3.0%
10 Download software for amusement	5	2	7	3%	2%	2.6%
11 Other non IT use	4	2	6	2%	2%	2.2%
12 e-shopping	5		5	3%	0%	1.9%
13 Downloading music	4	1	5	2%	1%	1.9%
14 Gambling	4		4	2%	0%	1.5%
15 Visiting pornographic sites	2	1	3	1%	1%	1.1%
Total No of Uses ranked 1	226	103	329	123%	120%	121.9%
Cybercafe Users who did not respond	21	11	32	11%	13%	11.9%
Survey Users who assigned 1st priority to more than one use	21	6	27	11%	7%	10.0%
Total number of Users in Survey Sample	184	86	270	100%	100%	100.0%

Source: Data from survey carried out by Kristiansen, Futurholt, and Wahid, 2005.

The survey was carried out in November - December 2003

* The question asked was: "What are you using the Internet Café for at this time? (Please rank relevant alternatives according to importance.)"

Table A5. Reasons for Using the Particular Warnet where Interview took Place

Purpose	Number of times Respondents Mentioned this as a reason for Using this Particular Warnet					
	Number of respondents that mentioned this as a reason for using this particular Warnet			Number of times this reason was mentioned, as a percent of the number of respondents - by gender and total		
	Male	Female	All	Male	Female	All
1 Location	112	65	177	61%	76%	66%
2 Access speed	106	53	159	58%	62%	59%
3 Quality of service	58	31	89	32%	36%	33%
4 Price	80	37	117	43%	43%	43%
5 Variety of services	32	11	43	17%	13%	16%
6 Competency of staff	22	14	36	12%	16%	13%
7 Meeting friends here	37	22	59	20%	26%	22%
Number of Users in Survey	184	86	270	100%	100%	100%

Source: Data from survey carried out by Kristiansen, Futurholt, and Wahid, 2005.

The survey was carried out in November - December 2003

* Multiple reasons were allowed. Twenty users also gave "other reasons".

Table A6. Intensity of Internet Use by Survey Respondents

Internet Use: Days per Month and Hours per session	Days/Hours of Internet Use			Percentage of Users by Frequency of Use of the Internet		
	Male	Female	All	Male	Female	All
Days of Internet Use per month						
Less than 5 days	77	35	112	42%	41%	42%
6 to 15 days	72	35	107	39%	41%	40%
16 to 25 days	23	13	36	13%	15%	13%
every day	11	2	13	6%	2%	5%
Number of Valid Responses	183	85	268	100%	100%	100.0%
Hours of Internet Use each time						
One hour or less	24	13	37	13%	15%	14%
More than 1, up to 2 hours	95	49	144	52%	58%	54%
More than 2, up to 4 hours	53	18	71	29%	21%	27%
More than 4 hours	10	4	14	5%	5%	5%
Number of Valid Responses	182	84	266	100%	100%	100.0%
Days/month & Hours/Session						
Less than 5 days						
One hour or less	14	9	23	8%	11%	9%
More than 1, up to 2 hours	46	19	65	25%	23%	25%
More than 2, up to 4 hours	15	5	20	8%	6%	8%
More than 4 hours	1		1	1%		
6 to 15 days						
One hour or less	9	3	12	5%	4%	5%
More than 1, up to 2 hours	34	22	56	19%	27%	21%
More than 2, up to 4 hours	24	9	33	13%	11%	13%
More than 4 hours	4	1	5	2%	1%	2%
16 to 25 days						
One hour or less	1	1	2	1%	1%	1%
More than 1, up to 2 hours	11	6	17	6%	7%	6%
More than 2, up to 4 hours	9	4	13	5%	5%	5%
More than 4 hours	2	2	4	1%	2%	2%
every day						
One hour or less						
More than 1, up to 2 hours	3	1	4	2%	1%	2%
More than 2, up to 4 hours	5		5	3%		2%
More than 4 hours	3	1	4	2%	1%	2%
Number of Valid Responses	181	83	264	100%	100%	100%

Source: Data from survey carried out by Kristiansen, Futurholt, and Wahid, 2005.
The survey was carried out in November - December 2003

Table A7. Estimated Annual Expenditures of Internet Users (US\$/yr) *

Age of Interviewee and Annual Expenditure Category	Number of respondents			Percentage of Users by Estimated Annual Expenditure Category		
	Male	Female	All	Male	Female	All
Users 40+ years old						
less than US\$ 365 / yr						
US\$ 365 - 730 / yr						
US\$ 730 - 2000 / yr	1		1	25%		25%
over US\$ 2000 / yr	3		3	75%		75%
Number of Valid Responses	4	0	4	100%	0%	100%
Users 30 - 39 years old						
less than US\$ 365 / yr	3		3	13%	0%	12%
US\$ 365 - 730 / yr	9		9	39%	0%	36%
US\$ 730 - 2000 / yr	8	2	10	35%	100%	40%
over US\$ 2000 / yr	3		3	13%	0%	12%
Number of Valid Responses	23	2	25	100%	100%	100%
Users 20 - 29 years old						
less than US\$ 365 / yr	35	23	58	32%	37%	57%
US\$ 365 - 730 / yr	54	29	83	49%	46%	47%
US\$ 730 - 2000 / yr	20	11	31	18%	17%	18%
over US\$ 2000 / yr	2		2	2%	0%	2%
Number of Valid Responses	111	63	174	100%	100%	100%
Users 13 - 19 years old						
less than US\$ 365 / yr	15	3	18	75%	33%	62%
US\$ 365 - 730 / yr	5	6	11	25%	67%	38%
US\$ 730 - 2000 / yr			0	0%	0%	0%
over US\$ 2000 / yr			0	0%	0%	0%
Number of Valid Responses	20	9	29	100%	100%	100%
All users						
less than US\$ 365 / yr	54	26	80	34%	35%	34%
US\$ 365 - 730 / yr	68	35	103	43%	47%	44%
US\$ 730 - 2000 / yr	29	13	42	18%	18%	18%
over US\$ 2000 / yr	9		9	6%	0%	4%
Number of Valid Responses	160	74	234	100%	100%	100%

Source: Data from survey carried out by Kristiansen, Futurholt, and Wahid, 2005.

The survey was carried out in November - December 2003

* Annual expenditure estimate is based on survey response to: "Total average monthly expenditures this year".

Table A8. Distribution of Yogyakarta Warnet Users by Time of Day, Age and Gender

Characteristic	Morning (8-12)		Afternoon (13 - 17)		Evening (18-22)		Total	
	No	%	No	%	No.	%	No	%
Male								
13-19	11	31%	20	57%	4	11%	35	100%
20-29	44	38%	36	31%	35	30%	115	100%
30-39	7	27%	8	31%	11	42%	26	100%
40+		0%	2	50%	2	50%	4	100%
No. valid responses	62	34%	66	37%	52	29%	180	100%
Female								
13-19	2	20%	1	5%	7	70%	10	100%
20-29	25	34%	20	91%	29	39%	74	100%
30-39			1	5%	1	50%	2	100%
40+				0%				
No. valid responses	27	31%	22	26%	37	43%	86	100%
All - Male & Female								
13-19	13	29%	21	47%	11	12%	45	100%
20-29	69	37%	56	30%	64	72%	189	100%
30-39	7	25%	9	32%	12	13%	28	100%
40+	0	0%	2	50%	2	2%	4	100%
No. valid responses	89	33%	88	33%	89	100%	266	100%

Source: Data from survey carried out by Kristiansen, Futurholt, and Wahid, 2005.
The survey was carried out in November - December 2003

Bagian 3. Penggunaan dan pengetahuan komputer dan Internet
Computer and Internet use and knowledge

1. Silakan nilai kemampuan/pengetahuan Anda dalam hal-hal berikut:
How do you consider your skills/knowledge?

	<i>Pemula Beginner</i>			<i>Ahli Advanced</i>	
a. Pengetahuan komputer <i>Computer knowledge</i>	1	2	3	4	5
b. Pengetahuan Internet <i>Internet Knowledge</i>	1	2	3	4	5
c. Kemampuan Bahasa Inggris <i>English language proficiency</i>	1	2	3	4	5

2. Kapan Anda menggunakan Internet pertama kali? _____ (tahun) *year*
When did you access the Internet the first time?
3. Bagaimana Anda mempelajari cara menggunakan Internet? (boleh lebih dari satu pilihan)
How did you learn to use the Internet? (multiple choices allowed)

a. Pendidikan/kursus formal
a. Formal course/education

b. Belajar sendiri
b. Self-learning

c. Bertanya kepada kawan
c. Asking friends

d. Bertanya kepada operator warnet
d. Internet café staff

e. Lainnya, tuliskan _____
e. Other, please specify

4. Rata-rata, berapa hari dalam sebulan Anda menggunakan Internet? _____ hari
At an average, how many days per month do you use the Internet? _____ (days)
5. Rata-rata, berapa jam Anda terhubung Internet setiap kali menggunakannya? _____ jam
How long time are you normally connected to the Internet each time? _____ (hours)

6. Dimana Anda menggunakan Internet? (pilih semua yang sesuai)

Where do you normally use the Internet? (multiple choices allowed)

a. Rumah
a. At home

b. Tempat kerja
b. At my work-place

c. Sekolah/kampus
c. At school/university

d. Warung Internet
d. At an Internet Café

e. Lainnya, tuliskan _____
e. Other, please specify _____

7. Berikan persentase (%) bahasa yang Anda gunakan ketika mengakses Internet

Which language(s) do you use when accessing the Internet (average %-distribution)?

a. Inggris *English* _____ %

b. Indonesia *Indonesian* _____ %

c. Lainnya, tuliskan _____ %
Other, please specify:

8. Faktor apa yang membatasi Anda dalam menggunakan Internet? *(Silakan beri angka pada kolom di sebelah kanan untuk menunjukkan mulai yang paling membatasi dengan angka 1 (satu) dan seterusnya)*

What factors limit your use of the Internet? (Please rank relevant alternatives according to importance.)

	Ranking
a. Biaya <i>Costs</i>	
b. Kecepatan akses <i>Access speed</i>	
c. Waktu luang <i>Spare time</i>	
d. Jumlah informasi dan layanan yang bermanfaat di Internet <i>Amount of useful information or services</i>	
e. Kemampuan personal <i>Personal skills</i>	
f. Lainnya, tuliskan _____ <i>Other, please specify</i>	

9. Menurut pendapat Anda, apa yang paling menjadikan Anda frustrasi dalam menggunakan Internet?
In your opinion, what are the main frustrations by using the Internet?

10. Apakah penggunaan Internet mempengaruhi kehidupan sosial Anda?
Does your use of the Internet affect your social life?
 a. Tidak *No* b. Ya *Yes*

11. Jika 'Ya', bagaimana/dalam hal apa? *If yes, in what way?*

12. Apa hobi Anda yang lain (selain mengunjungi Warnet)
What 'hobbies' do you have (outside the Internet Café)?

Bagian 4. Penggunaan Warung Internet (Warnet)

1. Rata-rata, berapa hari dalam sebulan Anda mengunjungi Warnet? _____ hari
At an average, how many days per month do you visit an Internet café? _____(days)

2. Rata-rata, berapa jam Anda terhubung Internet setiap kali menggunakan Internet di Warnet? _____ jam

How long time are you normally connected to the Internet each time you visit an Internet café ? _____(hours)

3. Rata-rata, berapa jam waktu yang Anda habiskan (termasuk untuk ngobrol, sosialisasi, dan sebagainya) setiap kali Anda mengunjungi Warnet? _____ jam

How long time do you normally spend in the Internet café per visit ? _____ hours

4. Apa yang Anda lakukan di Warnet dalam **kunjungan sekarang ini**? (Silakan beri angka pada kolom di sebelah kanan untuk menunjukkan prioritas **kegiatan yang Anda lakukan dalam kunjungan ini**)

What are you using the Internet Café for at this time? (Please rank relevant alternatives according to importance.)

	Ranking
a. E-mail	
b. Mencari informasi Seeking information	
c. Penelitian Research	
d. Chatting	
e. Membaca berita online Reading online news	
f. Mengunjungi situs porno Visiting pornographic sites	
g. Main game computer Computer games	
h. Belanja online E-shopping	
i. Melakukan bisnis Doing business	
j. Berjudi Gambling	
k. Download musik	
l. Download informasi dan software yang terkait dengan pekerjaan/profesi Downloading information and software for professional use	
m. Download informasi dan software untuk hiburan Downloading information and software for amusement	
n. Menggunakan layanan terkait komputer lainnya (seperti scanning, cetak, copy file ke CD, dsb.) Other IT-related services (e.g. copying, scanning, etc.)	
o. Menggunakan warnet untuk hal tidak terkait komputer (seperti makan, sosialisasi, dsb.) Non-computer-related use (e.g. socialising, eating, etc.)	

5. Apa alasan Anda menggunakan **warnet ini**? (pilih semua yang sesuai)

Why do you use **this** specific Internet Café? (multiple choices allowed)

a. Harga
a. Price

b. Lokasi
b. Location

c. Kualitas layanan
c. Quality of Services

Annex 4:

Perú - Information Services to Increase State Purchases from Small and Microenterprises¹

Peru's Contract and Purchase Law (Ley 26850) which became effective early in 2001 significantly increased commercial opportunities for micro and small enterprises employing fewer than 40 workers. The law requires every State agency to notify PROMPyme of those tender processes involving small amounts. Low value purchases matter the most, because those are the kinds of purchases that small enterprises are in a better position to supply competitively.

The law now requires every State institution to inform PROMPyme of every tender process it launches involving Low Value Purchases (*Adjudicaciones de Menor Cuantía*) as well as of Select Direct Tenders (*Adjudicaciones Directas Selectivas*). These small tenders need to be awarded expeditiously and, accordingly, do not require written public calls for proposals. Select Direct Tenders are awarded after inviting no fewer than three suppliers, in addition to the requirement of a ten day advance notification to PROMPyme. Low Value Purchases involve smaller quantities. They are more numerous and more frequent and are generally filled by awarding the purchase to the best bid from suppliers. Traditionally Low Value Purchases are filled by predetermined suppliers that are invited to submit their bid; now they also need to consider proposals submitted by enterprises that learn of the tender from PROMPyme. In this case, notification to PROMPyme must be concurrent with issuance of invitations to prospective suppliers.

Peru: Approximate Values (US\$), Notification Requirements to PROMPyme and Consultation Periods of Low Value Purchases and Select Direct Tenders

		Low Value Purchases		Select Direct Tenders***	
		Mínimum*	Maximum	Mínimum**	Maximum
Civil Works		8,900	26,000	26,000	129,900
Goods		3,580	10,100	10,100	50,500
Services		3,580	4,300	4,300	21,600
Notification requirements	Civil Works	7 days between the call for proposals and the deadline for their presentation		10 working days between calls for proposals have been issued and the deadline for the presentation of proposals.	
	Goods and Services	Deadlines for the presentation of proposals may be set shortly after the call for proposals has been issued (even within the same day). Notification to PROMPyme must be simultaneous with issuance of invitations to tender.			
Period of consultation and formulation of tender documents		Does not apply.		4-5 days of consultation and refinement of tender documents.	

* After this minimum amount, the law requires that PROMPyme be notified.

** Under this amount, the tender is regarded to be a Low Value Purchase.

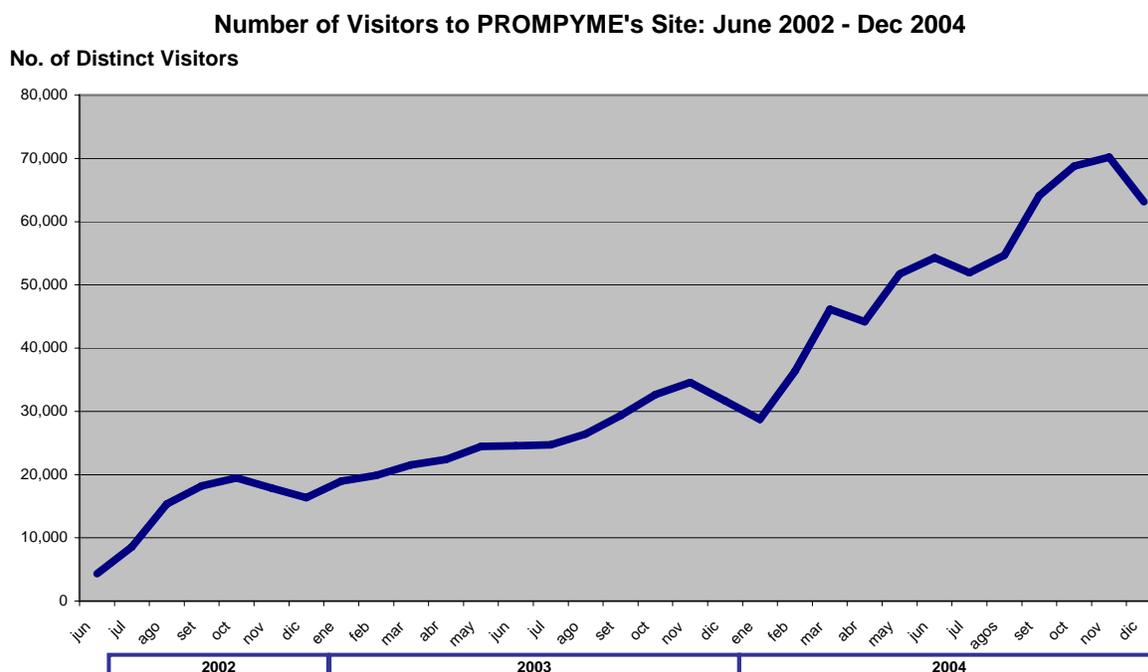
*** Should a Select Direct Tender become vacant, it becomes a Low Value Purchase.

Source: [Caroy 2002a].

¹ Based on: Proenza (2003b), updated to 2004 with the assistance of Miguel Caroy, chief of State Purchases, PROMPyme.

Once PROMPyme receives the calls for proposal, it immediately notifies enterprises through various means, including a one minute daily radio announcement, posting in its own premises and PROMPyme’s website (www.prompyme.gob.pe/compras_estatales/).

In principle, failure to inform PROMPyme in a timely fashion may lead to the challenge and eventual nullification of a tender award. In practice, PROMPyme has been able to persuade agencies to conform with the law and the number of properly informed tenders has increased from 77 percent in September 2002 to 98.3 percent by the end of 2004. The average number of business opportunities notified per month to PROMPyme has increased from 1,273 in 2000, to 3,847 in 2004. The process is also gaining in effectiveness, as government agencies are making increasing use of the Internet to notify PROMPyme. The proportion of calls for tender received via e-mail increased from 40 percent in January-April 2002 to 81.3 percent in 2004; while at the same time calls for tender notified through other means fell in importance (32% to 8.7% by fax and 29% to 9% by courier).



Prompyme’s support to small entrepreneurs using the system includes training (<http://educa.prompyme.gob.pe/elearning/>), a virtual forum where the main features of the system and the law are explained (<http://www.prompyme.gob.pe/foro/>), and an online consultation system where user’s queries are answered via email User consultation system (<http://otrs.prompyme.gob.pe/otrs/index.pl>).

Initial results are encouraging. PROMPyme’s website is by far the principal means through which entrepreneurs learn of existing small scale opportunities to sell to the State, and the number of visitors to this site has been rapidly increasing. A total of 14,709 users have subscribed to the PROMPyme portal and have asked to receive notices of State purchases from PROMPyme by e-mail. More suggestive, the proportion of central government purchases that were supplied by small enterprises rose from 23 percent in 2001 to 39 percent in 2004. In 2004, US\$ 756 million of goods and services purchased by State agencies were supplied by small enterprises.

Annex 5¹: Chile's Redsercotec Advice Online Service

Recent years have witnessed a surge in business development services (BDS) offerings online, mostly geared to small and micro enterprise development, many provided under government sponsorship. What is the impact of these “services? It is difficult to tell because practically no monitoring is taking place. With so much duplication it is probable that many of these websites are used infrequently and yield little of practical value.

This annex examines the experience of a promising advice online service developed and supported by Chile's Technical Assistance Service. Sercotec is Chile's agency charged with promoting the development of the country's micro and small enterprises. Sercotec's web portal, Redsercotec (www.redsercotec.cl), supports the agency's mainstream activities through the online provision of services and information to the agency's clients.

SERCOTEC's experience with advice online stands apart from other online BDS initiatives. First, Redsercotec is a public service provided at no charge to small and microentrepreneurs. Second, it is directed to serve not just a narrowly defined group (e.g. farmers) but all of Chile's small entrepreneurs with a broad range of interests and needs for information and services (e.g. legal advice, training, entrepreneurship, information on specific sectors like agriculture). Third, to be able to meet a broad range of interests, Sercotec has partnered with many other institutions to provide expert advice. This exemplifies an effective use by the public sector of the low-cost networking power of the Internet. Fourth, the system has been operational since March 2002 and was upgraded in 2005, and Sercotec thus has had time to garner experience. Through trial and error and careful monitoring, the agency has drawn on this experience to increase reach and effectiveness. Fifth and most importantly, the system is low cost, easy to implement and requires low maintenance. It has significant potential for replication elsewhere, to help public agencies increase their reach and become more citizen oriented, transparent, and accountable at reasonably low cost, provided minimum conditions of literacy, a single language and access to ICTs apply.

How the system works

Users registered in the site may send specific queries to any one of about 90 specialists (59 Sercotec staff members plus those of 29 partner public and private institutions) covering 45 thematic areas. For each advice category, the site gives the user a choice of several specialists, showing for each of them his or her picture, location, summary *curriculum vitae*, a record of the questions that the specialist has previously received and answered, and of the ratings that previous users have given to each response. An answer to each query is given within 48 hours. Upon receiving the advisor's reply, users are invited to rate the response on a 4-level scale from excellent to unsatisfactory.

1

This Annex is forthcoming as a publication in the Journal of Information Technology for Development, prepared by Francisco J. Proenza in collaboration with Sergio Iván Salas, Abdulla Aleter, Francisco Pérez-Trejo and Kayan Jaff.



Claves para la Gestión

Asesoría en Línea

Capacitación

Autoconsultoría

Experiencia Empresarial

Personajes

Links de Interés

Categorías de Asesoría:

- Acuicultura
- Agropecuaria
- Artesanía
- Asesoría Jurídica
- Asociaciones gremiales
- Asociatividad
- Biblioteca
- Capacitación
- Comercialización
- Comercio
- Comercio Exterior
- Concurso de Proyectos:
- "Conquistando Nuevos Mercados"
- Costos
- Creación de empresas
- Créditos y reprogramación
- Desarrollo Económico Local
- Desarrollo Regional
- Emprendedores
- Estadísticas
- Evaluación de Proyectos
- Ferias y exposiciones
- Finanzas
- Gestión de Calidad
- Gestión de Empresas
- Industria de la Madera

Asesoría en línea

Categoría Seleccionada: Creación de empresas

Como usuario registrado usted podrá realizar preguntas a los consultores. Antes de realizar una pregunta, le recomendamos revisar las **Preguntas Frecuentes**.

Este servicio es de orientación básica, nuestro compromiso de respuesta es de dos(2) días hábiles

[Ver Preguntas Frecuentes](#)

Asesores pertenecientes a esta categoría:



Oscar Bernal -
SERCOTEC Copiapó

[Hacer pregunta***](#)



Paul Pastén

[Hacer pregunta***](#)



Ximena Molina -
SERCOTEC Santiago

Sample Question and Answer – Agriculture and Livestock

18 June 2004 Query

Question:

Greetings Dear Pedro,

The information you gave me last time has been quite useful, thank you.

A new doubt arose for which I have been looking for an answer but that I have not been able to resolve. This is why I take the liberty to ask you, to see if you can get a response.

Oregano oil is not sold in its pure state, but mixed with other oils (e.g. olive) in a 40% to 60% or 50% to 50% ratio.

Why is this? Is it that pure oil is not feasible?

Sincerely,

Segundo Henriquez

Answer:

Mr. Henriquez

From what I have been able to find out, the reason behind the mixture is that when pure oregano oil is used on the skin or directly ingested it will most likely cause burs or strong irritation. AS you probably know oregano oil is a very powerful disinfectant, which eliminates fungus, bacteria, microbes and even viruses, and is also used to disinfect surfaces. Furthermore, it has anti-inflammatory properties and regulates digestion. For these reasons, it is commonly used mixed with other more neutral oils, generally extra-virgin olive oil.

Sincerely yours,

Rodrigo Salinas O.
SITEC R. M.

When the system was started it relied exclusively on Sercotec's staff, but soon was expanded by adding advisors through partnerships with other institutions. Partner advisors participate in the service at no cost to Sercotec. Three types of partnership arrangements are used: i. Formal Agreement of Collaboration between Sercotec and the partner organization; ii. Letter of intent between both parties; and iii. Word of mouth agreement, used occasionally in the case of highly qualified individuals with no formal institutional links but who offer to collaborate on a voluntary basis.

Presently there are 57 Sercotec staff advisors supporting the system, complemented by advisors from twenty nine private, public and academic organizations (Table 1 lists the 25 active in 2005). Sometimes a partner will assume responsibility for providing the advice as an agency. In other instances individual experts within a partner organization are chosen. From a user's perspective, Sercotec's partnerships mean a comprehensive service, with more thematic options from which to choose. A user may for example direct his agriculture related query to a Sercotec agriculture specialist, or, if he prefers, to the National Institute of Agricultural Development (INDAP).

Table 1. Partner Agencies Providing Advisors to Support Redsercotec Online Service

Institution*	Public	Private	Academic
National Institute of Ag. Dev. (INDAP)	X		
Chilean Handicrafts Export Org. – Comparte		X	
Legal Program – University of Chile			X
Associations of Chile	X		
National Training and Employment Service – Sence	X		
Export Promotion Agency – ProChile	X		
e-Procurement (Chile Compra)	X		
Cooperatives Department – Min. Economy	X		
Dep. of Industrial Property – Min. Economy	X		
BancoEstado	X		
Banco de Desarrollo		X	
Banefe (commercial bank)		X	
Consultora B&S (consultancy firm)		X	
Subsecretariat for Regional Development – Subdere	X		
National Statistics Institute – INE	X		
U. Santiago de Chile SME Program - Apyme-Usach			X
Natural Resources Information Center – CIREN	X		

Center for Dev. of Technologies for the Environment - Cedetema – U. Tecnológica			X
National Environment Commission – Conama	X		
National Institute of Norms – INN	X		
Labor Directorate	X		
Mutual Seguridad (Employment Risk Mgmt.)		X	
Inst. Normalización Previsional – INP (Soc. Sec.)	X		
National Tourism Service – Sernatur	X		
International University SEK			x

*Includes only institutions whose advisors were queried during the period July 2004-May 2005.

Other notable features of the system follow.

The system is user friendly with individualized interfaces for both advisors and registered users. Communication with advisors and users is via email. Whenever a query is directed to an advisor, the system sends an email to inform her. Whenever a user's query has been answered he is notified and directed to look for his answer in the Redsercotec portal. The system includes a feature that makes it easy for advisors to convert repeat questions into frequently asked questions that are useful for general reference.

Intellectual property rights are respected. An advisor will generally pass on information that he is familiar with based on his experience and expertise. He may also refer the user to a site or source where he may purchase more detailed information or reports.

Anyone visiting the portal can view all questions and answers posted. Entrepreneurs wishing confidential consultation – e.g. an entrepreneur exploring a new market who may not want to share his explorations with potential competitors – may always visit Sercotec offices or a partner agency directly.

Sercotec has developed a number of manuals and procedural guidelines. An example is a set of guidelines that help orient participating advisors regarding the system and operating procedures.

The system is partly written in open source code and partly in proprietary software (i.e. Cold Fusion and Breeze for e-learning).

The system operates on 48 hour response. If a particular advisor is unable to answer within the 48-hour period, (e.g. because of illness or vacation), Sercotec's Content Editor redirects the query to another qualified advisor.

Up to now, the personalized query system has not become a burden. The additional work load per advisor seldom exceeds answering three queries per day, and the total number of queries for the entire system is perhaps 10 a day.

A key to success is the selection of qualified professional advisors. Poor advisors with poor ratings could undermine credibility of the system, and create potentially compromising situations for the System's managers and for the advisors.

Monitoring and Evaluation

To submit a query users first need to register in the system. Registration enables Redsercotec to better know its online clients. At end of May 2005, there were a total of 29,187 registered users (Table 2), from 330 of the country's 350 *comunas*. Thirty percent of these were from the metropolitan area, Santiago, where 40% of the country's population lives; 68% were from generally poorer *communas* outside the capital. A third of registered users were women. Nearly 40 percent were entrepreneurs and 45% were would-be entrepreneurs.

Table 2. Distribution of Registered Users of Redsercotec by Entrepreneurial Status, Residence and Gender (May 2005)

	Male		Female		Total	
	No.	% male	No.	% female	No.	% of total
entrepreneurs	7,480	67	3,602	33	11,082	38.0
aspiring entrep.	8,948	67	4,367	33	13,315	45.6
other	2,964	62	1,826	38	4,790	16.4
Total	19,392		9,795		29,187	100.0
Metropolitan Region	6,043	68	2,854	32	8,897	30.5
Regions I – XII	13,035	66	6,835	34	19,870	68.1
foreigners	314	75	106	25	420	1.4
Total	19,392		9,795		29,187	100.0

Only about a third of users evaluate the responses they receive. Table 3 lists all of topics presently serviced, showing first those with higher number of queries, and presents the ratings given to answers by topic. From the time that user evaluations were introduced in mid-2004 to the end of May 2005, 53% of the responses have been rated excellent; 33% satisfactory, 8.5% poor and 5.6% weak.

**Table 3. User Evaluations of Advice Online Service Responses
(July 2004 - May 2005)**

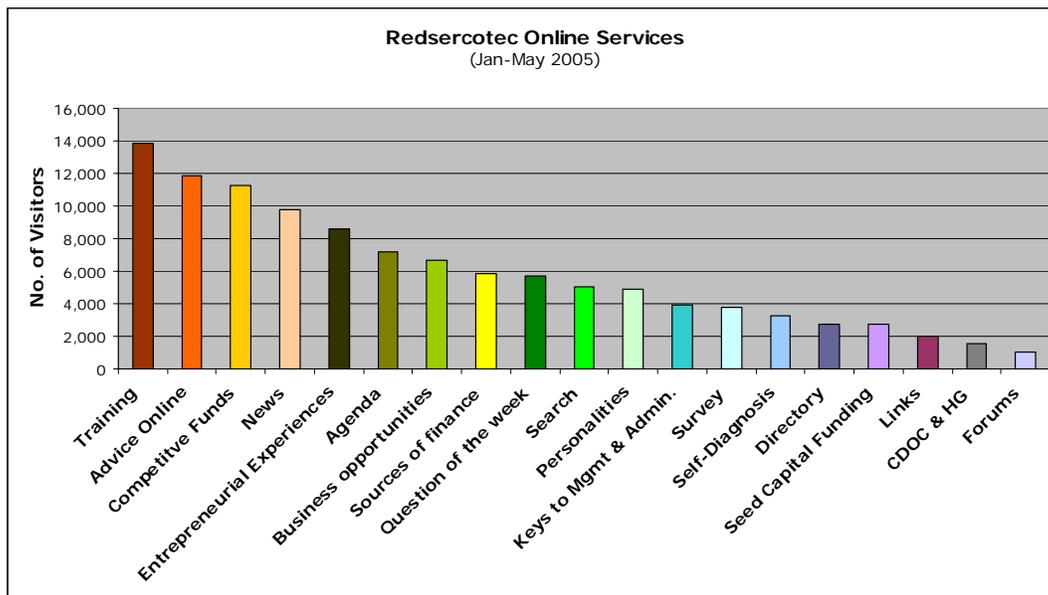
Thematic Area	User Ratings				No. of questions	
	Excellent	Satisf.	Poor	Unsatisf.	Answered	Evaluated
Taxation	21	7	2	1	88	31
Agriculture	13	13	4	3	86	33
Legal Advice	22	6	1	2	71	31
Entrepreneurship	11	3	2	0	52	16
Tourism	3	5	0	0	24	8
Enterprise Formation	6	4	0	0	23	10
Artisanry	1	2	0	1	22	4
External Trade	1	3	2	2	22	8
Project Evaluation	3	3	1	0	22	7
Enterprise Management	4	3	1	2	22	10
Labor legislation	5	0	1	0	16	6
Aquaculture	1	1	0	0	14	2
Costs	0	1	0	1	14	2
Financing and Credit	1	1	3	1	14	6
Technology	3	1	1	0	14	5
Seed Capital Grant	3	1	0	0	13	4
Environment	4	0	0	0	13	4
Promotion incentives	1	0	0	0	11	1
Associations	1	1	0	0	10	2
Training	0	2	2	0	10	4
Marketing	1	3	0	0	10	4
Trades and Fairs	0	2	0	0	10	2
Strategic Planning & Oper. Dev.	2	3	0	0	10	5
Commerce	1	1	0	0	9	2
Financial Management	0	2	0	0	7	2
Marketing	5	1	0	0	6	6
Family Microenterprise Law	1	0	0	0	6	1
Norms and Standards	0	0	0	0	6	0
Culture and heritage	1	2	0	0	6	3
Local Development Mgmt.	1	1	0	0	5	2
Informatics	0	0	0	0	5	0
Risk prevention	0	0	0	0	5	0
Labor Organizations	2	0	0	0	4	2
Wood Industry	2	1	0	0	4	3
Artisanal fisheries	1	2	0	0	4	3
Industrial Property	1	0	0	0	4	1
Quality Control	0	1	0	0	3	1
Human Resources	1	1	0	0	3	2
Regional Development	1	0	0	0	2	1
Statistics	0	0	0	0	2	0
Telecenters	0	0	0	0	2	0
State Purchases	0	0	0	0	1	0
Cooperatives	0	0	0	0	1	0
Natural Resources Information	0	0	0	0	1	0
Industrial Parks	0	0	0	0	1	0
TOTAL	124	77	20	13	678	234

Monitoring of user behavior and satisfaction with the services provided is an integral part of the system. User registration helps Sercotec keep its clients informed of important materials, services and events through a monthly newsletter, and tailor services to meet their needs. User feedback increases transparency and enables Sercotec to monitor the individual competence of advisors and the overall quality of the advice imparted. It also serves as a powerful self-regulating quality control mechanism. No advisor likes to see his advice questioned or ranked poorly in public by a user. Since users vary in expertise and experience (e.g. questions from a student may require a different answer or approach than those coming from an experienced professional) Sercotec is planning to introduce registered user profiles that will give advisors more information about users seeking their advice.

Other Redsercotec Services

Advice online is the focus of this study and is one of Redsercotec’s more popular services (second in popularity between January – May 2005), but it is not the only one. The chart below shows the full range of services provided and the number of visits to each service in January - May 2005.

All online services are well integrated to Sercotec’s mainstream activities. Training modules turned out to be more popular than advice online in January-May 2005, mainly because Sercotec has been running training courses in all of its offices and these make use of training materials made available online at the Redsercotec portal. The advice online service similarly supports other activities, as advisors recommend other parts of the site, and other online and face to face Sercotec activities.



The site also gives access to valuable tools created by partners from other countries. A Self Assessment test enabling a user to determine his own capacity to become a small entrepreneur was made available by Spanish cooperation (GIPE, Gabinete de Iniciativas Para el Empleo y Universidad de Alicante). An Auto-diagnostic system developed in Mexico helps an entrepreneur identify her weaknesses and take corrective action.

Costs and Benefits

The design and development of the latest version of the Redsercotec portal was outsourced at a total cost of US\$ 60,000. This includes approximately US\$ 8,000 in software licenses. The entire system (which includes Advice Online as well as the other services) is run by a Unit Chief, a Content Manger and a Webmaster. Running costs amounted to US\$ 52,000 in the first two years of operation and US\$ 35,000 in the third. These operating cost figures are marginal with respect to Sercotec's overall annual operating budget of US\$ 16 million (in 2004).

The opportunity cost of advisors is not large, considering that they choose the time at which to answer the queries within the 48 hour period given. Advisor's themselves allocate the time to answer and it is not likely to be when they are busy with pressing matters of high value. Further, many of the questions are not particularly difficult to answer, either because the answer is readily available (even within other parts of the Redsercotec's portal or through an experienced online search), or at times simply because what a small or aspiring entrepreneur is looking for is a gentle guiding hand before they embark on a new undertaking that is challenging and important to them.

The cost of advisors to participating agencies is often more than compensated for the advertising value, prestige or personal satisfaction that comes with supporting the system. This does not mean that there is no cost involved; simply that there is an exchange in value that occurs that benefits everyone without involving the actual transfer of money. For example, some of the more difficult questions have been addressed to the legal clinic of the University of Chile. The students who serve as advisors benefit from practicing law in a real world context. The professor running the clinic and the university also benefit from the advertising, recognition and public good generated as a result of providing a valued public service.

Sercotec's advice online system is appreciated and frequently used by its clientele. Since it was instituted in 2002 to November 2004, a total of 5,500 questions were submitted by users and answered through the system. Since the evaluation of responses started in July 2004 through 31 May 2005, 678 questions have been asked and answered and 234 have been evaluated by users mostly (86%) ranked either satisfactorily or better. From mid 2002 through May 2005, the number of visits to the advice online service section was 189,094, which represents 19% of the total number of visits (971,852) to the Redsercotec portal during this period.

The advice online system has helped improved the effectiveness of Sercotec's mainstream operations. The advice online system, for example, is currently being used to answer queries in relation to a new Sercotec program that enables users to apply online to seed capital grants that finance small entrepreneurial initiatives. There has also been an observable increase in the interaction between Sercotec's staff, as advisor's seek help from one another in responding online queries.

The use of the Internet has also helped expand Sercotec's overall reach. The regular clientele benefiting from ordinary activities of the agency number about 10,000, compared to nearly 30,000 registered users of Redsercotec.

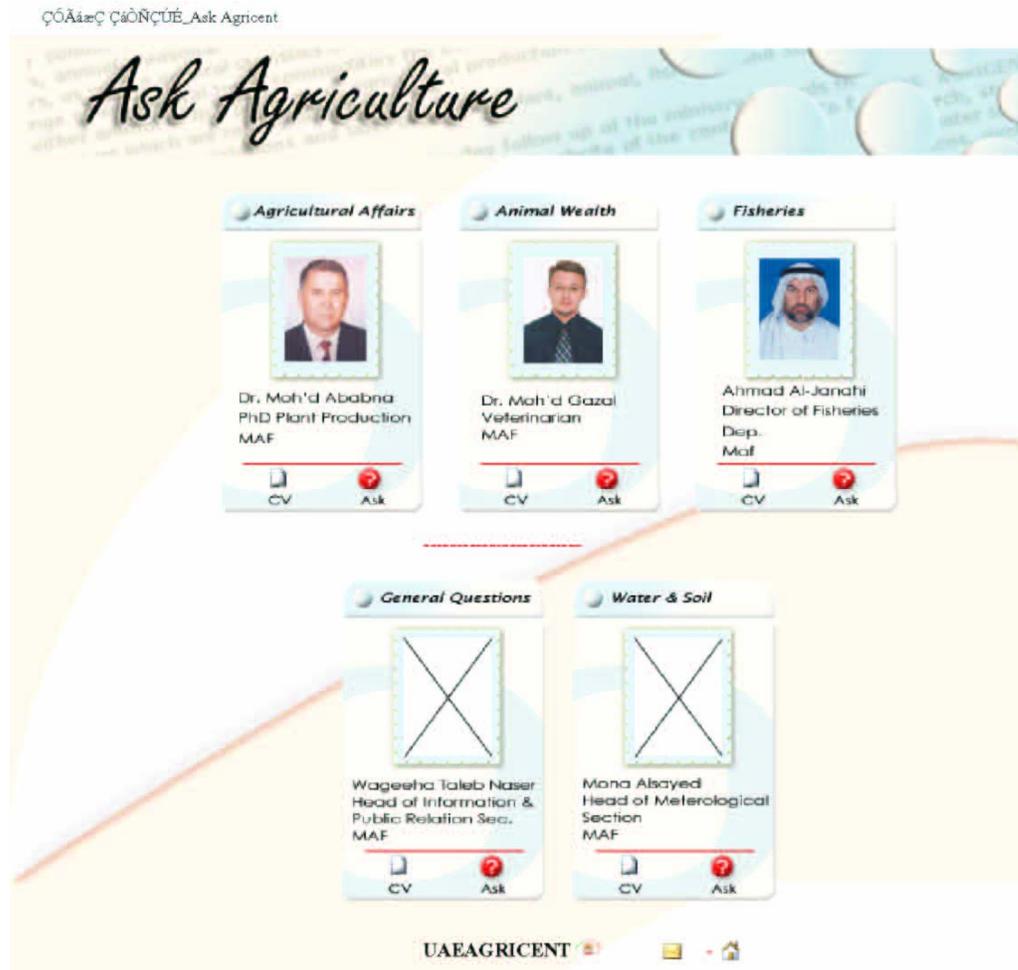
Is the System Tranferable?

The provision of personalized advice online, where users determine the kind of information they need and interact directly with advisors, is a promising emergent application world wide. Advice is available for a fee from Google Answers (<http://answers.google.com/answers/>), presently at US\$ 2.50/query. Provision

of agricultural extension advice online services is also being experimented with in India, by the International Institute of Information Technology, Hyderabad, (<http://agriculture.iiit.net/agrids/>); and by the Indian Institute for Technology, Madras, and n-logue Communications, in the latter case using videoconferencing technology to a network of about 2,400 village kiosks (www.n-logue.com/services.htm).

Some basic conditions must be met before systems like Redsercotec's advice online can be effective. The system is practicable in countries where literacy is widespread and a single language is common – e.g. most of Latin America, the Caribbean and large countries like China, and Indonesia. It would be harder to implement in countries with multiple languages or where illiteracy is a major challenge (e.g. India, many countries in Africa). A minimum number of existing or aspiring entrepreneurs with access to and familiar with the use of computers and the Internet is also an important prerequisite.

Once these basic conditions are met implementation of the system depends on public service leadership. The United Arab Emirates Ministry of Agriculture and Fisheries launched its own advice online system in March 2004 (http://uae.gov.ae/uaeagricent/AskQ/ask_you_question_eng.htm).



As of May 2005 the UAE system's 5 advisors had answered over 700 questions. Subsequently, as a result of a videoconference between FAO, UAE specialists visiting Rome, and Sercotec Management,

cooperation has enabled the UAE to profit from Chile's experience. Some of the features UAE officials hope to adapt to local conditions are: the expansion to serve other entrepreneurial needs not just those of farming, the establishment of partnerships with universities and other public and private institutions, and the implementation of user evaluation of responses.

Conclusions

The questions received through the advice online service are real felt needs of Sercotec's target audience and constitute a wealth of information that the agency is only beginning to exploit to design new programs, online content, and personalized services. It provides an increasingly important link between the demand and the provision of personalized public services on a massive scale. Consider also the system's impact on public service incentives and the implications for public agency efficiency, accountability and transparency. Imagine you are a public servant and that every question you are asked, you are obliged to answer within 48 hours, in the understanding that your response will be placed on record identifying you as the author, and made available for everyone in the world to read. Furthermore, consider that the quality of your response will be immediately evaluated by the user and that this user's feedback will be known to your supervisor and your institutional partners and published next to your name.

Annex 6:
Email Survey of Users of Ministry of Agriculture Market Online System

This annex contains the translation of the email that was sent to the approximately 868 persons who used the Market Online system of the Ministry of Agriculture, and of the 13 responses received.

Draft Email sent to 868 persons

Jakarta, February 24, 2005

To: << **Name of Person** >>

Thank you for appreciating and using our Market Online services (<http://agribisnis.deptan.go.id>), introduced on June 1, 2004 with the topic: << **product offered to buy or sell** >>.

To improve and develop the system, we would appreciate it if you could inform us about the following:

1. Have you received any responses from the people seeing your advertisement on our website, through the market online system as well as direct contact? If yes, how many responses have you received?
2. Could you add some information on transactions for further development of the system?
3. Do you have any suggestions to improve/develop the market online services and other services on our website?

Thank you for your suggestions to help improve the quality of our services. Please send your reply to the address: agribisdata@deptan.go.id a week after receipt of this email at the latest (4 March 2005).

Regards,
Data & Information Subdivision, BPPHP

Responses Received

Out of the 868 persons to whom the survey email was sent, only 12 responses were received. These responses are copied below.

From: ruspam subarna
To: pip
Sent: Sunday, March 27, 2005 9:20PM
Subject: Re: feedback

To the deptan.go.id management

I use deptan.go.id to look for black sticky rice seeds. I want to try to use the black sticky rice in place of white rice in Sukabumi because its economic value is higher. Until now I have received no responses yet to what I am looking for. For your information, the quality of local black sticky rice is still poor.

Thank you for your attention.
Ruspam Subarna

From: "Stanis" stanis@csis.or.id
To: "pip" pip@deptan.go.id
Sent: Sunday, March 27, 2005 11:15 PM
Subject: Re: feedback

I am sorry for replying late,

1. There was one response only. He directly contacted me by hand-phone but we did not enter into any transaction. There was just a phone conversation.
2. What you mean is not clear to me or I miss the point. To be sure, there was no transaction. He asked me if I had a stock. He did not bargain/ask the price he wanted. I suggest that the market online services should describe prices and, if necessary, a wide range of commodities (clove, cocoa bean) abundantly available outside Java.
3. Equally important is information about buyers (persons as well as companies particularly in Jakarta with their prices) on your website. By doing so, regions will be eager to offer their commodities here.

From: Pahlevitz Antaricsa Heirawan
To: pip
Sent: Wednesday, April 06, 2005 7:12 AM
Subject: Re: feedback

To date, I have not received any direct or indirect responses. To increase our sales we now make door-to-door offers to consumers for the market segments of manufacturers, hotels and hospitals. Our current market segments of manufacturers are Cilegon & Bojonegara. We will expand into the industrial areas of Cikampek and Pulo Gadung – East Jakarta.

Regards,
Pahlevitz Antaricsa Heirawan

From: "Iwan Trihandono" <han_dono@yahoo.com>
To: <agribisdata@deptan.go.id>
Sent: Monday, February 28, 2005 5:56 PM
Subject: Responses
Surabaya, February 28, 2005

To Agribis Data
Ministry of Agriculture

Dear Sir,

First, I want to thank you for your great help with the facilities you provide in the publication of MAJALAH BISNIS (Business Magazine).

It is worth noting that:

1. I have so far received about 10 (ten) responses from the public. Some still stay in contact with me while the others do not. They come from here and abroad.
2. The information I need to add is: We also trade some agricultural produce such as clove, rice & merbau timber, and so forth.
3. We suggest that the existing data can be updated at any time because we also buy certain agricultural/ plantation/forest products from time to time. We also suggest that you provide the easiest access to buyers and sellers for agribusiness development.

Thus, we have made this letter,

Thank you.

From: "gaharu farm" gaharu_farm@hotmail.com
To: "koa" pip@deptan.go.id
Cc: "agribisdata" agribisdata@deptan.go.id
Sent: Thursday, March 17, 2005 6:53 PM
Subject: Re: feedback

So far we have not received any response from anyone. Please give us some information and guidance to market our products.

Thank you.

From: Guevara santayana
To: agribisdata@deptan.go.id
Sent: Sunday, February 27, 2005 10:44 PM
Subject: Re: feedback

In reply to your questions sent by email on 24/02/05, we have not received any response from anyone so far and we are still waiting for the results of the netmarketing we use on your website. We thank you for your kind attention to find out our existence and development.

From: reza florist
To: <agribisdata@deptan.go.id>

Sent: Friday, February 25, 2005 6:28 PM
Subject: REZA FLORIST's answer
Surabaya, February 28, 2005

Ministry of Agriculture Data and Info Subdivision,

We have received many responses and thank you for your market online services. We make direct contact and receive online orders. It is very useful to improve our marketing and help fellow hobbyists, patients, etc. to learn our information. We suggest that you should display the latest news about the agribusiness world, financial system to help micro enterprises as recently declared by President Susilo Bambang Y., institutions that provide financial aid for Small and Medium Enterprises, and management training as done to China's small enterprises that are growing so fast. We do not want China's products to seize our market, do we?

Regards,
REZA FLORIST AND HERBAL
Supplier of Handicrafts, Natural Plants, Mixed Plants, etc

From: "agus hendarto" <agus-hendarto@telkom.net>
To: agribisdata@deptan.go.id
Sent: Sunday, February 27, 2005 9:34 PM
Subject: Re: feedback

Dear Sir,
I have received some responses but they do not have clear identity so that I have great difficulty contacting them. In general, they are like me dealing with e-marketing so that I really find it hard to meet them.
Regards

From: giandra fabisha
To: agribisdata@deptan.go.id
Sent: Monday, February 28, 2005 5:51 PM
Subject: Re: feedback

I have received some responses to my posting to sell the gambier stock we had at that time. There are just less than 10 responses. Maybe there are not many interested in gambier.
Thank you for your attention.
Regards,
Sandra

From: "Arifianto"
To: agribisdata@deptan.go.id
Sent: Tuesday, March 01, 2005 12:19 PM
Subject: Fwd: feedback

Reply:

There was 1 respondent through the system, but the location is not as I expected. There was no direct contact. I have no further information and suggestion.

Bekasi, 01/03/05

Thanks.

From: Tedy Dirhamsyah

To: agribisdata@deptan.go.id

Sent: Monday, February 28, 2005 7:31 PM

Subject: Re: feedback

I thank you to the Ministry of Agriculture for launching its Market Online. It has been of great help to me because I received two orders for leather jackets from PT. SSI and POS PBB. It proves helpful to promote my products. Even, some from foreign countries asked me for samples and information about our products by email. Most individuals directly visit our place/shop at Jl. Buncit Raya Ujung No. 16, Ragunan, Pasar Minggu, South Jakarta. The most underlying problems with the system are frequent errors, slow access/sometimes difficult access, and difficult entry of new info. (In fact, almost every week I want to provide new information about my business developments, but the access is difficult. Even if I have entered the info, it is still difficult for me to enter into the Market Online database.) If they can be solved, the system will be of greater help to us, businesspeople. To improve services, our capacity to enter information should be increased. For example, we can post pictures, etc. Once again, thank you.

Tedy

Thanks.

From: "ASEP HERMANSYAH" <sixoex@plasa.com>

To: pip@deptan.go.id

Sent: Sunday, April 03, 2005 9:27 PM

Subject: SUGGESTIONS FOR MINISTRY OF AGRICULTURE (DEPTAN)

THANKS FOR YOUR EMAIL,

I HOPE DEPTAN CAN PROVIDE EXCLUSIVE AGROTRADE SERVICES. IT MEANS THAT THE SERVICES ARE USED BY THE REAL USERS OF THESE SERVICES AND THE USERS MUST GIVE DATA ON THE IDENTITY OF THEIR COMPANIES SUCH AS BUSINESS LICENSE (SIUP), TAXPAYER REGISTRATION NUMBER (NPWP) AND CERTIFICATE OF INCORPORATION (TDP). PLEASE PROVIDE ACCESS TO THE GLOBAL MARKET FOR REGISTERED LIMITED USERS AND G-TO-G OR G-TO-B MEDIATION SERVICES ON THE GLOBAL MARKET, AND STRENGTHEN E-FARMER AND E-TRADEAGRO SYSTEMS.

BEST REGARDS,

ASEP HERMANSYAH

ALTERNATIVE EMAIL SPAAGRY@HOTMAIL.COM

PT. SINERGI PUTRA ANDALAS

GOOD LUCK TO E-AGRO INDONESIA TO THE GLOBAL MARKET.

Annex 7: Digital Literacy Training in Chile by BiblioRedes

Chile's *Campaña Nacional de Alfabetización Digital* launched in May 2003 is a national effort to train 500,000 Chileans in basic computer and Internet skills in 2003-2005. Several government agencies participate. The *Servicio Nacional de Capacitación y Empleo*, Sence, for instance, provides funding to help enterprises train workers. Other agencies use their own telecenters to impart literacy training. The largest is run by the Ministry of Education's Enlaces program, which initially provided connectivity to practically all of the country's schools, and has since opened up school laboratories for community service including digital literacy training. By the end of 2004 Chile's digital literacy program had trained a total of 300,000 people.

BiblioRedes (www.biblioredes.cl) is another major partner of Chile's national digital literacy campaign. BiblioRedes is a project of the *Dirección Nacional de Bibliotecas, Archivos y Museos*, supported by a US\$ 10 million grant from the Bill and Melinda Gates Foundation. The project's objective is to provide community access to computers and the Internet through all of Chile's public libraries.¹

BiblioRedes has a network of 368 libraries and 17 regional training laboratories providing public access to computers and the Internet and computing training services to the communities they serve.² Each library has from 2 to 7 computers. Its training program is supported by the regional laboratories each of which is equipped with 11 desktop computers. In addition, each region also has a mobile laboratory with 11 laptop computers and a projector. The mobile labs move about within the region providing training support to community libraries.

BiblioRedes Facilities used for Training Purposes

No		No. courses/week	No. of Computers	Average No. of Computers	Total No. Computers
368	Libraries	1-2	2-7	4.1	1509
17	Laboratories	4-5	11	11	187
17	Moving Laboratories	support libraries	11		187
					1900

Training cycles at BiblioRedes started on April 2002 with workshops to introduce the Project to library staff, in preparation for the arrival of the computers. Once the computers arrived, training at the libraries began in September 2002. Since then, a total of 120,000 people have received digital literacy training (Modules 1, 2 and 3; see description of Module 1 below), and an additional 21,000 have benefited from the more advanced training – Modules 4 (Spreadsheet & Word Processing), 5 (Presentations and Publishing) and 6 (Local Content Creation – through BiblioRedes portal).

As a general rule, BiblioRedes libraries and laboratories aim to keep at least 70% of the equipment fully occupied during training. Whenever a computer is not being used, however, it is made available for service to the public.

¹ One of the requirements of the Bill and Melinda Gates Foundation grant funding is that access to the Internet and computers be provided free of charge by participating public libraries.

² BiblioRedes has a regional laboratory in each of the 12 regional capitals plus an additional one in Regions V (Los Andes), viii (Chillán) and X (Valdivia). There are also 2 regional laboratories serving the Metropolitan Region (Recoleta and San Bernardo). Each regional supervisor is entrusted with a maximum of 26 libraries.

All of BiblioRedes services are provided free of charge to users, including access to the library laboratories as well as digital literacy training. As the program has advanced, it has begun to rely on local volunteers, who are happy to give back their recently acquired skills to other members of the community. This is a source of pride for new members and for BiblioRedes, as well as a way to build positive social capital.

Principal Courses Imparted by BiblioRedes as Part of its Digital Literacy Training Program

Module	Course	Idealized schedule (which in practice is flexible)				
		Hours	Days	Hrs/day	Total	Remarks
1, 2, 3	Basic: Computer Use to Keep Informed and Communicate	14	7	2.0	14	contiguous days
Supplementary Applications Modules						
4	Computing for Work (Spreadsheet, Word Processing)	10	5	2	10	contiguous days
5	Computing to Present (Power Point, Publisher)	10	5	2	10	contiguous days
5	Local content (prepare own page at www.biblioredes.cl – aimed at local formal and informal organizations)	10	5	2	10	contiguous days

Some important lessons of experience follow:

1. It is important to have one student with a computer during training. Initially BiblioRedes tried to put two students per computer, but almost invariably this resulted in only one of the two students learning, and the other one left behind.
2. Enabling practice time after training sessions is also very important. Efforts to train using mobile units that travel from one place to another may increase awareness, but will not result in actual learning for subsequent practical use.
3. It is useful to first apply an initial needs assessment among the target training group. This enables instructors to plan the training modules so that it better suits the needs of the trainees; e.g. putting together people with similar levels of competence, or with similar interests. This makes for more effective and more entertaining training sessions.
4. Every training participant receives a certificate of attendance, provided that he or she attends at least 80% of the sessions of the course. No testing of competence has been introduced, to encourage potential adult trainees and let them feel confident and comfortable.

A translation of BiblioRedes Digital Literacy Training (Modules 1, 2 and 3) Curriculum, Courtesy of BiblioRedes, follows.¹

¹ Additional training materials may be found at Sence’s web page: www.sence.cl/tecnologias_digital.htm.

Digital Literacy Course: Computer Use to Keep Informed and Communicate with Others (Modules 1, 2 and 3)

General Course Objective

- Demonstrate the technological and social benefits of computers, through Internet and email.
- Help new users acquire basic skills that will enable them to obtain information through the Internet and communicate via email.

Content of Course: Basic Computers + Word Processing + Internet + email

Target Trainees: The course is imparted in libraries and is open to everyone, but a special effort is made to target economically active adults 18 to 60 years of age, with little or no prior experience in the use of computers and limited possibilities for individual access to computers.

Course requirements: None

Course duration: 14 hours

Course plan:

The course generally takes the form of a 2 hour session every day for a period of 7 contiguous days. This calendar works well in terms of maintaining the interest of beneficiaries and the focus of training staff, but may be adjusted to fit specific local needs.

Flexible Implementation - Modules 2 and 3

Module 1 is designed to meet the needs of persons with no prior knowledge of computers. Nevertheless, the module is flexible and may be adapted to accommodate users with some prior skills.

For example, for users who already have some basic knowledge of computers and know how to use the mouse and the keyboard, then “Module 2” is applied. Module 2 is essentially the same as Module 1, but omits the first 4 sessions and starts with word processing (session 5 below). The latter module then only lasts between 10 and 12 hours. Similarly, for users who are only interested in learning how to use the Internet and have their own email account, then Module 3 is applied, covering only sessions 8 – 14 (about 7 hours duration).

Course Content & duration	Specific Objectives
<p>1. Getting to know the computer</p> <p>60 minutes approx.</p>	<p>By the end of this session users will be able to:</p> <ul style="list-style-type: none"> • Visually identify and name the main computer hardware components. • Start and shut down a monitor, the computer and the printer. • Identify and name common computer peripherals: mouse, speakers, earphones, and printer. • Identify input and output devices.
<p>2. The mouse</p> <p>60 minutes approx.</p>	<p>By the end of this session users will be able to:</p> <ul style="list-style-type: none"> • Identify parts of a mouse: buttons, sensor or displacement ball, roll. • Identify different functions of the mouse (e.g. open and close programs, turn computer off, adjust a computer's volume). • Recognize different forms of using the mouse (e.g. one click, double click). • Distinguish effects of right and left clicks of the mouse. • Drag icons along the Desktop screen.
<p>3. Operating System Windows XP</p> <p>60 minutes approx.</p>	<p>By the end of this session users will be able to:</p> <ul style="list-style-type: none"> • Explain what the desktop is. • Understand the concept of "Operating System". • Understand basic concepts like icon, windows, folders, and direct access. • Open and close programs, folders, windows, using the mouse. • Create a personal folder in My Documents.
<p>4. The Keyboard</p> <p>60 minutes approx.</p>	<p>By the end of this session users will be able to:</p> <ul style="list-style-type: none"> • Identify different parts of the keyboard. • Use capital letters and accentuate. • Use space bar, enter key, Escape key, Tab key. • Write a basic text document (name, personal information) using a word processor.
<p>5. Word processing</p> <p>60 minutes approx.</p>	<p>By the end of this session users will be able to:</p> <ul style="list-style-type: none"> • Identify ways of opening the Word Processing application. • Identify and recognize the toolbars most frequently used when using a word processor: File, Edit, Format, Tools. • Become familiar with basic functions needed to write a basic text document: letter types and fonts, alignment, tabs. • Write a basic document using a word processor. • Save a document in a floppy disk or in the My Documents folder.

Course Content & duration	Specific Objectives
<p>6. Word Processing: Cut, Copy, Erase, and Move</p> <p>60 minutes approx.</p>	<p>By the end of this session users will be able to:</p> <ul style="list-style-type: none"> • Open a text document previously saved. • Select a part of the text, a word in the text, a sentence or a paragraph. • Use cut and copy functions to edit text. • Use paste function to add text within a document, or to a new document. • Use the move function to change the location of a word, sentence or text segment.
<p>7. Text documents and images in a Word Processing Application</p> <p>60 minutes approx.</p>	<p>By the end of this session users will be able to:</p> <ul style="list-style-type: none"> • Modify a document using cut, copy and paste functions. • Add an image file or a graphic element to a document. • Move images or objects drawn within a document. • Change the size of an image. • Save changes made to a document.
<p>8. ¿What is the Internet?</p> <p>60 minutes approx.</p>	<p>By the end of this session users will be able to:</p> <ul style="list-style-type: none"> • Identify the basic services and resources available through Internet. • Become familiar and recognize the structure of a suitable browser (e.g. Mozilla Firefox). • Identify what each of the icons in the Internet Tools bar is useful for. • Identify the basic elements that make up a web page. • Visit web pages with the assistance of the instructor.
<p>9. Information Search using the Internet</p> <p>60 minutes approx.</p>	<p>By the end of this session users will be able to:</p> <ul style="list-style-type: none"> • Carry out a simple specific guided search. • Select the information desired. • Print the information that they want to have. • View a preview before printing.
<p>10. Navigation the Internet with a purpose</p> <p>60 minutes approx.</p>	<p>By the end of this session users will be able to:</p> <ul style="list-style-type: none"> • Visit different sites of interest to the user. • Receive or obtain information from various media – newspapers, radio, and television, through the Internet. • Visit specific service sites, such as Banks and government services online.

Course Content & duration	Specific Objectives
11. email: an email account 60 minutes approx.	By the end of this session users will be able to: <ul style="list-style-type: none"> • Create their own email account (e.g. hotmail). • Identify and work with their own email opening page inbox. • Identify the different functions of the main page: Inbox tray, Write, exit, etc. • Write and send messages. • Become familiar with structure of Compose, e.g., To: Subject, CC: etc. • Reply and send reply and forward an email.
12. email: functions 60 minutes approx.	By the end of this session users will be able to: <ul style="list-style-type: none"> • Enter their email service. • Review messages from their inbox tray. • Add contacts to their contacts list. • Re-send a message. • Send messages with copies (cc) and using blind copy (bcc:)
13. email: attachments 60 minutes approx.	By the end of this session users will be able to: <ul style="list-style-type: none"> • Send an email with an attachment. • Open and save an attachment. • Send an email with an image file attached. • Use copy and paste in order to insert text from a source which is different from the message. • Erase the text of a message. • Delete a file attachment.
14. email: filing and managing messages 60 minutes approx.	By the end of this session users will be able to: <ul style="list-style-type: none"> • Manage their Entry tray: erase messages: send messages to the trash bin, empty the deleted items folder. • Search for a message. • Create a new emails folder. • Move messages to the new emails folder created. • Order messages according to name, subject matter and date.

Annex 8: Gender Case Studies

Community Radio Kamal Muara

Location: TPI Kamal Muara, Jakarta Barat

Date of visit: 3 February 2005

Interview done with: Mr. Irfan

Description of the Project:

The community radio of Kamal Muara was initiated in 2001 by young volunteers in the fishing areas of Kamal Muara Sub District in West Jakarta. At the beginning, the community radio aimed to connect fishermen with their families when they are out fishing. Later on, the contents of the broadcasts were broadened to answer to other needs such as information on education, health, family planning, and market information.

Kamal Muara has about 4600 households consisting of 3 RW. Fishing is the livelihood of most of the residents of the community. There are 55% women and 45% men living in this community. Most of the women in the community are housewives. There are a number of micro-credit activities managed by women in the community, as well as income generating activities managed by community.

The main concerns in the community include the high cost of electricity, the amount of industrial waste that flows into the water near the area which has affected the villagers health and the impending reclamation project in the area which will negatively affect people's livelihoods. This reclamation is for a planned real estate housing project. A court case is ongoing to prevent the reclamation.

The community radio started in 2001 with a monthly Bulletin/Magazine disseminated to all households at RW 01 (1000 Households). By the end of 2003, active broadcasting was launched and programs ran between 3 p.m. and 12 midnight. The station is run from a room located in the village center, next to the station is the kindergarten. The radio has a 5 kilometer range which is what is legally allowed under the law. The radio has one permanent broadcaster.

Participation of the community in the radio program, particularly women, is still very low. Most of the women remain as listeners. Apart from low levels of education, women in this area are also less mobile or have less access to other areas in Jakarta. The members of the fishing community typically remain their areas.

The radio program is broadcast everyday with music, information about health (dengue, TB), environmental concerns and fishing. Information source include mass media, government departments and several NGOs. Residents can request music to be played or ask for specific information and they pay 1000 rupiahs for every 3 requests. The money raised is the only source of income of the station. The radio station has two computers and basic radio equipment.

The station has a Saturday program for girls. There is also women's organization in Kamal Muara (which is a chapter of the Koalisi Perempuan, a national mass organization of women) that have

actively participated in the campaign for the domestic violence law/regulation in the country. The radio program has also covered issues of domestic violence.

The crew of the community radio consists of 12 senior graduate voluntary teenagers who broadcast on the radio, as well as design the contents of the programs. The scheme has been more effective in delivering information to the society, which has very low levels of education (junior high school and lower), as compared to other schemes. Capacity building of the institutions, as well as training for the management of the Radio, is conducted by an NGO called COMBINE, which provides capacity building opportunities for community radio programs in Indonesia. Funding for the community radio is obtained from coupons sold when community members request for a song to be played. One coupon cost Rp. 500. And every day, more that 100 coupons are sold.

The radio station is not connected to the internet because the community cannot afford it. Volunteers check email once a month at the local WARNET.

Telecenter e-Pabelan

Location: Islamic Boarding School, Pabelan Village, Mungkid, Magelang, Central Jawa Province.

Date of visit: 11 February 2004

Interview done with:

- 1. Ms. Nuki (Head of the Village)**
- 2. Kiayi Achmad Mustofa (religious leader)**
- 3. Mr. Mahfud – Public relations - Pabelan Islamic Boarding School**
- 4. Four organizers of the Pabelan Telecenter**

Description of the Project:

e-Pabelan: Partnerships for the e-Prosperity for the Poor

UNDP-Bappenas Pilot Project in Pesantren Pabelan

e-Pabelan, a pilot project, is being implemented by the United Nations Development Program (UNDP), in conjunction with the National Planning Agency (Bappenas, Badan Perencanaan Nasional). It is a community development initiative using information and communication technology (ICTs) to improve the lives of the poor.

The objectives of e-Pabelan are as follows:

- *To empower the poor in Pabelan with access to basic information such as market, farming, trading, education, and health information;*
- *To enhance the capacity of Pabelan people in accessing information, computer skills, telecenter management, etc. through trainings;*
- *To mobilize Pabelan people to improve their economy with community development initiatives using information and communication technology; and*
- *To build partnerships with stakeholders to develop the community in Pabelan.*

The main activities of e-Pabelan are as follows:

- *Baseline survey of the general socio-economic as well as ICT environment characteristics within poor communities in Pabelan*

- *Telecenter Establishment (infrastructure preparation; HW/SW Procurement; computers, network, and internet installations) and Operation*
- *Telecenter Staffs and info-mobilization researcher recruitment*
- *Trainings (info-mobilization, computer skills, system admin and network management, internet, telecenter management)*
- *Ethnographic Action Research for e-Pabelan and Community Development Activities using ICT (for example, telecenter usage by the poor)*
- *Content Collection & procurement*
- *National ICT4PR Seminar in Yogyakarta*

e-Pabelan works in close partnership with Pesantren Pabelan, the Pabelan community and village authorities. Other institutions have expressed interest in partnering with them in the future. These include the Open Learning University (Universitas Terbuka), Universitas Gadjah Mada, Warintek (Kiosks of Information and Technology – The Agency for the Assessment and Application of Technology), PUSTEKOM (Pusat Teknologi Komunikasi dan Informasi Pendidikan – Center for ICT for Education) – Ministry of National Education, and University of Gajah Mada.

The Pabelan telecentre was established in the Pesantren Pabelan school complex in July 2004. The Pabelan Islamic Boarding School was deemed the best site for the telecentre project for unique features. These include:

- Existing development initiatives for the poor.
Pesantren Pabelan actively conducts development initiatives that directly help its community in general and the poor to become more productive, healthier and more informed. One of these initiatives, the Community Development project was introduced in 1980 with the initial name: *Balai Pengkajian Pembangunan Masyarakat* (Center for the Assessment of Community Development). Main activities of this center are farming, fisheries, handicraft, and life stocks. The aim of the program is to improve the economic capability of the community, particularly the farmers. Since its establishment, Kiayi has been perceived as the center of information and is considered a role model for the village.

Many activities are held in Pesantren for many reasons. One of the main reasons is because the wife of the owner of the Pesantren is the Village Head (Kepala Desa) and therefore, many government initiatives are organized by and held in Pesantren. Another reason is because the Pesantren is already being used by several non-government organizations as a meeting place and a venue to hold activities.

- Demand driven.
Since Pesantren Pabelan has become the centre of information flow from the government and civil society (top-down), the community is used to seeking various information from the Pesantren (demand). Pabelan is a farming community that currently is in a vicious circle of middlemen domination. The farmers are not in a position to directly access their market and do not have the power to determine the price of their crops. They seek information regarding alternative crops that produce better yields, have more stable prices, more profitable, and are not controlled by the middlemen.

- Partnerships based.
Many stakeholders are interacting with Pesantren Pabelan to help the poor. These include the community, the local and central government, local NGOs, and the Pesantren Alumni. A partnership model amongst different stakeholders will be developed to accommodate their useful participations to increase the prosperity of the poor.
- Directly impacting the poor.
Many (if not most) of the students in Pesantren Pabelan come from poor families. They will be directly involved with the running and use of the telecentre. In addition, the poor community in Pabelan will be mobilized and will be directly involved in the process of reducing poverty with ICT.
- High chance of success.
There are many success factors which can contribute to the successful implementation of the pilot project in Pabelan, namely, enthusiasm and commitment from the Pesantren Pabelan leaders and the project team, high number of potential volunteers and users for the telecentre, and potential contributions from many partners.

The telecentre has five computers connected to Internet. The project is still in the socialization phase and slowly, use of computers and the Internet is being introduced to the village community. Therefore, the main activities in the telecentre are English language training and computer skills building.

Every day only 5 to 7 individuals use the Internet and they are mostly extension workers, teachers and students. They access the Internet at night when trainings are not in session.

Each training group consists of 15 participants. Thirty-two out of the sixty participants are women and the average age is 15 to 35. For the first year of operation (until about July 2005) all connection costs for Internet will be paid for by Bappenas to PT. Telkom. During this time, the center provides free of charge Internet connection for the users. There has not been any evaluation of the benefits from the telecentre. However, experience indicates that the telecentre has not been fully optimized by the community due to low levels of education and literacy in the village community.

Suara Ibu Peduli - Voice Of Concerns Mothers (Vocm)

Location : Wisma BOR Kompleks Megaria

Date of visit : 1 February 2005

Interview done with: Ms Erlini, Ms. Jument Komalasari and Ms. Pujiwati

Decription of the Project:

Suara Ibu Peduli or the Voice of Concern Mother (VOCM) was established in 1998 during the Indonesian economic crises. It was established by mothers in response to the high increase in the price of baby's milk. They protested to the government by holding public demonstrations. At

beginning of its establishment, the VOCM's activities were limited to advocacy. Today, their activities have expanded to:

- Establishing cooperatives that lends cash for its members
- Advocacy on women's rights
- Training on education related to health issues and small scale business management
- Training on taxes, skills building in cooking, salon, catering and handicraft
- Assisting in establishing income generating activities
- Providing some cash or technology based credits for the member of cooperatives

At present the VOCM has about 10,000 members in Jakarta, Bogor, Tangerang and Bekasi (Jabotabek) area. Out of this numbers, about 700 are members of cooperatives. The system of cooperative uses the similar scheme with those implemented by Puskowanjati (Tanggung Renteng Scheme). The members of cooperatives are formed into 32 groups. Each group consists of 20-24 member who live near each other. Membership fee is Rp. 1,000 per month. The cooperative provides cash credit for small business ranging from Rp. 500,000 up to Rp. 3, Million with the interest 2% per month. Whereas credit for household expenditures varies from Rp.300,000 to 1 Million with interest 1.5% per month.

The level of education of the cooperative's members is junior high school or below. The breakdown in members's employment is as follows :

- 50 % housewife work as maids, with average incomes of Rp. 400 – 700 thousands per month
- 20 % micro entrepreneurs with incomes of Rp. 500 thousand to 1 million
- 30% unskilled workers at industries with average incomes of Rp. 800,000 – 1,5 million

The main problems of members of VOCM are related to domestic violence, increasing drop-out rate of school girls and the lack of economic opportunities and skills to increase their livelihoods.

The mode of communication among the members as well as with the board members of the organization is bridged by six extension workers who work six days a week. Members also use fixed telephone line and cell phones while a small percentage use fax machines. The VOCM office has not used internet yet for their communication with the members as well as to gather information related to their work. Only the head of the NGO uses the internet and a computer.

Computer use in the head office is mainly for word processing, particularly related to the secretarial work, such as writing letters and articles. About seven women manage the office and all of them (except the Director and a staff who looks is more knowledgeable about IT) has just started to learn how to use computer for work processing. There are three computers in the office, and one computer is connected to the internet and is mostly used for email. The VOCM realizes the importance of ICT for their work and they expressed the desire to take advantage of ICT for their networking with the field coordinator of the cooperatives.

WARINTEK - Information Technology Shop

**Location : Sleman Library, Jl. Turgo 3, Beran, Tridadi, Sleman. Tel 62 275 868 405 ex 360
Sleman Distric, Yogyakarta
Date of visit : 8 February 2005**

Interview done with: Ms. Herawati, Coordinator of Warintek

Decription of the Project:

Warintek, a science and technology information shop, was developed by the office of the State Ministry for Research and Technology to improve and enhance the delivery current science and technology information products and services through applications of ICTs.

Each *Warintek* shop is equipped with computers with Internet access and CD ROMs containing appropriate technology for rural communities. Since its inception in 2000, *Warintek* shops have been established in many big cities all over Indonesia such as Jakarta, Bandung, Palembang, Padang, Bukit Tinggi, Malang, Surabaya, Jember, Sleman, Kupang, Lampung dan Jaya Pura.

Warinteks are usually integrated with local government libraries, university library or other organizations that provide information services for communities, in order to develop a scientific society in Indonesia.

Warintek has data and information on science and technology (S&T) in the form of CD ROMs. The database is located in PDII LIPI (Center for Documentation and Scientific Information, Indonesian Institute of ~~Sciences Technology~~). The database consists of research reports (98.5000 entries), Books and Theses on gender and S&T (68.000 entries), gender papers (62.000 entries), patents in the country and international (4.200 entries), appropriate technology (15.274 entries), and a catalog of magazines (4.600 entries). Data and information available at *Warintek* include economy, agriculture, appropriate technology, agribusiness, etc. As a network, *Warintek* has networks with other scientific organizations such as Ministry of Research and Technology, universities, Library of Local Government, etc.

In Sleman District, Yogyakarta, a *Warintek* shop located at the Local Government Library, Jl. Turgo 3, Beran, Tridadi, Sleman, has 7 computers with CD ROMs of appropriate technology and a link to the Internet. *Warinteks* are mostly used by students, researchers and community in general. Many of the users access to scientific information for writing theses, research reports and other scientific reports. Users can also order data and information needed through *Warintek*. With Rp. 2000 per hour, about 10 to 20 users -- men and women -- use *warintek* everyday. Ms. Herawati and a staff of seven manage the shop from Monday to Saturday. Although there is no accurate data on men and women users, daily experience shows that there are more men users than women users. Aside from *Warintek*, *this shop also has a Mobile Warintek*. A minibus that brings books and computers with CD ROMs to the users in the village area.

The Mobile *Warintek* visits different villages daily according to its schedule. Each village is visited once a week by this mobile *Warintek*. So far, 8 villages has been covered by this mobile *warintek*.

Puskowanjati, the Central Women's Cooperative in East Java

Location : Puskowanjati, the Central Women's Cooperative in East Java, Malang

Date of visit : February 7, 2005

Interview done with:

The gender team was accompanied by Ibu Asianti Oetojo and Ibu Sofia Kurniawati from the Electronic Data Processing Board, provincial government of East Java, Surabaya.

Description of the Project:

Puskowanjati, the Central Women's Cooperative in East Java (a member of the national women's Cooperative), is a secondary cooperative with a current membership of 43 primary cooperatives in the East Java region. Each primary cooperative has 300 to 11,000 individual members, with a total current membership of 45,000 women among all primary coops. Of these, 54 percent are reported housewives, 19 percent micro business owners, 6 percent active in agriculture, 1 percent active in animal husbandry, 1 percent active in handicrafts, and 20 percent miscellaneous activities.

Consistent with Puskowanjati's mission to improve women's resourcefulness, cooperation, and support the struggle for women's economic rights, the organization provides a number of services to its members, including:

- A micro-credit program (the largest component of the services provided)
- Business management and organizational strengthening support
- Cooperative management training and support
- Political training
- ICT training (a new program; more below)

The Cooperative is a well organized and trusted institution, with years of experience in servicing their members. Puskowanjati has implemented several programs in its area and has developed into a strong organization capable of managing a substantial micro financing program in addition to several support programs to its members. Cooperative staff appears to be well respected in their communities and has positioned the organization as a key agent of support for women within the community.

Founded in 1959 by Ibu Suradji, the Central Women's Cooperative in East Java was formed as an economic and social response to the increasing trends towards a capitalistic economic system. Based on the Danish cooperative movement, the Women's Cooperative's vision focused on providing support to women and training opportunities at different levels, including household management, working skills, business skills, etc. *Training* women was always a focus of the Cooperative.

The new ICT project is a recent initiative of the Puskowanjati. It started about 6 months ago and it has already trained 60 women (from primary cooperatives) on computer skills (focusing on Microsoft software applications and basics of the internet). Training focuses on software applications for financing and management activities. A four day package for ten people costs 3.5 million Rp. The current trainers are from other cooperatives and include three men but no women trainers. [Ibu Asianti's office has women trainers and suggested collaborating in this area.]

ICT use by the Cooperatives

Most cooperative offices have one basic telephone line but fax machines are not common. There is no internet connection at the primary cooperatives. Some micro credit loans have been used to acquire computers but most cooperatives operate without any computers. There is no community radio used for information sharing.

Members use basic telephone and, increasingly, cell phones. Cell phones are bought by individuals and SMS is the most common service used. Some micro loans have been used to buy cellular phones.

Currently, information dissemination methods include:

- Staff and extension workers that provide training, guidance and information at cooperative premises;
- Face to face help and assistance, particularly with illiterate members;
- Quarterly publication with news on cooperatives' activities;

Services to Members

Puskowanjati organizes annual programs for its members primarily in the areas of education, leadership, health, and management skills. These also include:

- Training for trainers and extension workers on specific issue areas;
- Facilitation of information exchanges among members to learn about different areas of activity;
- Capacity building activities for managers and members through specific meetings and gatherings;

Education programs tend to focus on issues related to the operations of the cooperatives. Health programs cover various areas of interest at different points in time, such as a seminar on menopause, or common diseases.

Micro financing Program

Micro financing is provided from the secondary cooperative to primary cooperatives. The size of the loans are based on 10 times the size of the membership fees, plus a fixed loan fee. Interest rates are 1.25% per month and the payment period is normally 24 months. Primary cooperatives use these resources to provide micro loans to their own individual members at an interest rate of about 2.3% and loans ranging from 5 thousand to 10 million Rps.

Microloans are used to cover a variety of activities, including household expenses, such as health fees and education, and micro business related expenses (e.g., food vendors, handcraft vendors). Household management and support is a priority area of action, since 54 percent of Puskowanjati primary members are housewives not registered in productive sectors. A large majority of these women are involved in the informal economy, however, their loans are used to facilitate a number of household related activities and expenses.

The cooperative micro credit program is based on the 'chain system' or "Tanggung Renteng", where the obligation to a small group is based on a number of values and trust among its members.

For most members, participation in the cooperative also provides an opportunity to meet other women, exchange information, increase self-esteem, have a source of support, among others.

Citra Lestari Primary cooperative

With over 3,500 members, Citra Lestari is a primary cooperative which started a micro credit program in 1991. In addition to the micro credit, it also operates a cooperative retail store, where members can sell their products. With regular meetings among its members and a global meeting

every semester, Citra Lestari has successfully implemented a large micro credit program with currently 162 coordinators managing the credit system. Based on the Tanggung Renteng system, groups of about 15 members work together to maintain a robust relationship and consequently benefit from their engagement in the program. Members include small entrepreneurs, construction workers, catering businesses, farmers, etc. Micro loans have been used for business improvement as well as household expenses, such as education, renovations, purchase of appliances, and--in a number of cases--computers and cellular telephones.

As a cooperative, Citra Lestari has invested in ICT by acquiring computers to assist in the maintenance of the cooperative retail store inventory, as well as to better manage the micro financing program information and details. The organization staff includes women trained with computer and accounting skills.

Despite its great success in the micro financing area, the cooperative faces urgent challenges:

- Increased competition from other cooperatives and smaller banks;
- Increasing knowledge of new members (i.e., demanding more sophisticated services);
- Increasing unemployment among members.

PUSTEKIM (Pusat Teknologi Informasi untuk Masyarakat)
Center for Community Training and Learning on Information Technology

Location: Pawenang village, Nagrak, Sukabumi Distrik.

Date of visit : 4 February 2005

Interview done with : Ms. Tuti Lidjaja and Ms. Soebarjati (Coordinator)

Description of the Project:

PUSTEKIM (Center for Community Training and Learning on Information Technology (CTLIC) is a project initiative of an NGO called Koalisi Perempuan (Indonesian Women's Coalition). Koalisi Perempuan Indonesia (Indonesian Women's Coalition for Justice and Democracy) is a women's mass organization with individual members base established in 1998.

The CTLIC is a 2-year pilot project, funded by Microsoft Indonesia, that provide training for women in mostly Microsoft applications (Word, Excel, Powerpoint, internet use, Encarta). The project started in December 2003 and is being implemented in five provinces namely West Nusa Tenggara, Bengkulu, West Sumatera, Jambi and West Jawa. The objective of the project is to encourage the communities, women and girls in particular, to use and benefit from ICT in their daily lives.

In West Jawa, a Pustekim is located in the village office of Pawenang, Nagrak, Sukabumi District. ICT literacy for women is very low in this area and women have less access to resources, including technology, as compared to men. Like many others villages in West Jawa, women and girls in Pawenang face constraints including lack of education, due to poverty. Older and less educated women are mostly employed in vegetable farms, food processing, households and as traders. Those who have completed high school, work in factories in nearby industrial areas.

There are six computers from Microsoft in the center. More than 340 (60% females and 40% males) have completed training. The demand for training in the community is high. The center has a waiting list of trainees and there are courses that run till midnight. Aside from Pawenang, the center has had to expand its coverage 4 other nearby villages. The trainees are a mix of students, employees, housewives and others. The computers are also rented out to the community and other users include local government staff, farmers and fishermen living in the area. Internet connection is very limited because connection is only through a scheme called Flexi, which relies on cell sites, and is very expensive. Therefore, only trainers use the [internet for email purposes and only](#) to send reports to Microsoft and the Koalisi Perempuan.

Preliminary evaluation of the impact of the CTLC shows that the benefits to the community and particularly to women are concentrated in the following:

- Increased capacity of girls in using computers supports their education through educational material available in the center
- Development of a [database](#) on reproductive health of women in the village (survey of contraceptive use)
- Collection and computerization of sex disaggregated election data which was recognized as the best data available in the district
- Strengthening of social networks as demonstrated by voluntary support by villagers and in extending the resources to other villages
- Personal empowerment of the coordinators of the center who are recognized as role models in the community

A critical issue for the CTLC are building sustainability beyond the support of Microsoft which will end by March 2006. Aside from equipment support, Microsoft shoulders 50% of the operational expenses of the center while the center's income from training fees covers the rest. Sustainability strategies that are being explored can potentially expand the CTLC's service to the community. This include moving beyond software training and building capacity to use the tools for different purposes, including new business opportunities, finding better jobs, development of more local content and generally more support on how to use ICT/computer skills for greater social and economic impact. The local government unit has realized that the Pustekim has helped a lot in advancing its women empowerment program, particularly in the village level and has approached government training authorities for possible support.

Annex 9

References and Bibliography

References

- Abdon Bunafe R., Raab Robert T. & Woods Jonathan, 2002: ICTs, e-learning, and simulations: bringing knowledge-intensive management to Asian agriculture, Paper presented at "International Federation of Information Processing 9.4 Conference", Bangalore, India, (www.aprtc.org/occasional_papers/ifipp.htm)
- Akman Amir, Idris Sulaiman, 2003: Information and Communication Development in Indonesia, country report, submitted to WSIS, Geneva, 2003
- Apoyo, Uso y Actitudes hacia Internet, 2004.
- Agenda de Conectividad, “Mejores Prácticas y Estándares para la implementación de Tecnologías de Información y Comunicaciones (TIC) en el Estado colombiano”, 20 May 2004. (www.agenda.gov.co/documents/files/InteroperabilidadParaIG.DOC)
- Annamalai, Kuttayan, and Sachin Rao, “What Works: ICT’s e-Choupal and Profitable rural Transformation”, World Resources Institute, August 2003. (http://povertyprofit.wri.org/pdfs/echoupal_case.pdf)
- Asia Foundation, 2004. “Streamlining Business Licensing and Registration”, July 2004. (www.asiafoundation.org/pdf/indo_StreamliningBusiness.pdf)
- Asia Foundation, 2002: Microfinance services in Indonesia – a survey of institutions in six provinces. www.asiafoundation.org/pdf/Indo_microfinancesurvey.pdf
- Bashad, Akhtar, Sarbuland Khan and María Garrido, Connected for Development: Information Kiosks and Sustainability, UNICT Task Force Series No. 4, Department of Economic and Social Affairs, November 2003. (www.unicttaskforce.org/wsis/publications/Connected%20for%20Development.pdf)
- Bhatnagar, Subhash and Robert Schware, eds. 2000. Information and Communication Technology in Rural Development, World Bank Institute, Washington, D.C.
- Brata, Aloysius Gunadi, J. Dwijoko Anusanto, L. Indah Murwani Yulianti. 2002. *Pemanfaatan Teknologi Informasi Bagi Pengembangan Industri Kecil dan Menengah di Propinsi DI Yogyakarta* (Using Information Technology for Small-Medium Industry in Yogyakarta Special Region). Lembaga Penelitian Universitas Atma Jaya Yogyakarta: Laporan Penelitian. July 2002.
- Castells, Manuel, Mireia Fernández-Ardevol, Jack Linchuan Qiu and Araba Sey, The Mobile Communication Society: A cross cultural analysis of available evidence on the social uses of wireless communication technology”, Annenberg Research Network on International Communication, 2004.

- http://annenbergl.usc.edu/international_communication/WirelessWorkshop/MCS.pdf
- Castle Asia, “SMEs and e-Commerce”, Report prepared for the Asia Foundation, January 2002.
(www.asiafoundation.org/pdf/SMEsurvey_Indo.pdf)
- Cho, C. M., “Korea’s Effort to Build Telecenters as a Tool to Close the Digital Divide”, September 2004.
(www.adbi.org/conf-seminar-papers/2005/03/17/963.korea.telecenters.tool/)
- Ernberg Johan, 1997. *Universal access through Multipurpose Community Telecentres - - a business case?* Paper presented at the Global Knowledge 97 Conference, Toronto, 1997
- Ernberg, Johan, 1998. Integrated rural development and universal access - towards a framework for evaluation of multipurpose community telecenter pilot projects implemented by ITU and its partners.
<http://www.itu.int/ITU-D-UniversalAccess/johan/papers/guelph.htm>.
- Fuchs, Thomas, and Ludger Woessmann, “Computers and Student Learning: Bivariate and Multivariate Evidence on the Availability and Use of Computers at Home and at School”, CESifo Working Paper No. 1321, November 2004.
(http://papers.ssrn.com/sol3/papers.cfm?abstract_id=619101)
- Fukuyama, Francis, *State-Building: Governance and World Order in the 21st Century*, Cornell University Press, May 2004. (www.sais-jhu.edu/Faculty/fukuyama/State-Building)
- Gamos Ltd. and Big World, Sustainable Initiatives: Gyandoot, Madyha Pradesh, Information and Communication Technology Case Study, 2003.
(www.sustainableicts.org/Gyandoot%20F.pdf)
- Gobierno de Chile, “Campaña Nacional de Alfabetización Digital”, 2004
(www.alfabetizaciondigital.cl).
- Governo Brasileiro, e-PING: Padrões de Interoperabilidade de Governo Eletrônico, 31 Maio 2004.
(www.governoeletronico.gov.br/governoeletronico/publicacao/down_anexo.wsp?tmp.arquivo=E15_24115_1e-ping_minuta_v0_31052004_consulta.pdf)
- Heeks, Richard, “More Transparent Tendering for Infrastructure Development for Indonesia”, eTransparency Case Study No. 8, December 2003.
(www.egov4dev.org/indonesiatender.htm).
- Her Alibasyah, Utari Budihardjo, 2004: Warintek: Multipurpose Community Telecenters (MCTs) in Indonesia (report sent by email)
- Heriawan, Rusman, “Informal Sector Statistics and Supporting Surveys Indonesia Experience”, 7th Meeting of the Expert Group on Informal Sector Statistics, New Delhi 2-4 February 2004.
(http://mospi.nic.in/rusman_heriawan_a.htm)
- Hofman, Bert, Ella Rodrick-Jones and Kian Wie Thee, “Indonesia: Rapid Growth, Weak Institutions”, A case study from Reducing Poverty, Sustaining Growth – What Wroks, What Doesn’t, and Why, May-22-27, 2004.

www.worldbank.org/wbi/reducingpoverty/docs/FullCases/PDFs%2011-13-04/Indonesia%20country.pdf

Indian Institute of Management Ahmedabad (IIM-Ahmedabad), Rural Cybercafes on Intranet: Dhar Madhya Pradesh, India – A Cost Benefit Evaluation Study, October 2002.

www.iimahd.ernet.in/egov/documents/gyandoot-evaluation.pdf

Inter-American Development Bank, Information and Communication Technologies in Support of South American Competitiveness and Integration, December 2003.

www.iadb.org/regions/re3/pdf/IIRSA0204.pdf

International Telecommunications Union (ITU), “Cellular subscribers”, 2004.

ITU, “Information technology”, 2004a.

ITU 2003: World Telecommunication Development Report 2003

Kraemer, Kenneth L., and John Leslie King, Information Technology and Administrative Reform: Will the Time After E-Government be Different?, *Center for Research on Information Technology and Organizations. I.T. in Government*. Paper 337. August 2003.

<http://repositories.cdlib.org/crito/government/337/>

Kristiansen, Stein, Bjorn Futurholt, and Fathul Wahid, “Cyber cultural diversity: The use of Internet cafés in Indonesia” (preliminary unpublished draft), 2005.

Lee, Nae-Chan, “Broadband Internet Service: Korea’s Experience”, February 2002.

www.mic.go.kr/eng/res/res_pub_db/res_pub_sep_brd/Broadband_Internet_in_Korea_2002.pdf

Office of the e-Envoy, e-Government Interoperability Framework, 30 April 2004.

www.govtalk.gov.uk/documents/e-gif-v6-0.pdf

Park, Han Woo, “The Korea Information Society and Mass Media”, 2001.

Prahlad, C.K and Allen Hammond, 2002. “Serving the World’s Poor, *Profitably*” Harvard Business Review, September 2002, pp.48-57

Priowirjanto, Gatot Hari, “ICT Development in Indonesian TVET, Power Point Presentation (undated, circa 2005).

Proenza, Francisco J., 2001. "Telecenter Sustainability: Myths and Opportunities", Journal of Development Communication, December.

www.fao.org/Waicent/FAOINFO/AGRICULT/ags/Agsp/pdf/ProenzaTelecenter.pdf

Proenza, Francisco J., 2003^a. Argentina: Establecimiento y experiencia inicial de los Centros Tecnológicos Comunitarios, May.

www.e-paratodos.org/pdf/CTCsPrimerosAnos.pdf

- Proenza, Francisco J., 2003b. State Purchases from Micro, Small and Medium Enterprises - The Peruvian Experience, in Connected for Development: Information Kiosks and Sustainability, November.
(www.unicttaskforce.org/wsis/publications/Connected%20for%20Development.pdf)
- Proenza, Francisco J, 2004. Nicaragua Case Study: Review of Agricultural Information System and Proposals for Future Development, November 2004.
- Purbo, Onno, 2004. Indonesia Internet infrastructure - Digital Review for Asia Pacific 05/2004
- Robinson, Alex, 2005. ICTs and development in Indonesia: information, markets and livelihood options, Interim research report 2 prepared for Lembaga Ilmu Pengetahuan Indonesia (LIPI), Jakarta, Indonesia. March 2005
- Rodríguez, Francisco, Does Information Technology Raise Inequality?, Working Paper, University of Maryland,.
(www.bsos.umd.edu/econ/rodriguez/information.pdf)
- Rusdiah, Rudy, 2004: Multipurpose Community Internet Center: Prospek Warnet Masa Depan. Grasindo, Jakarta, 2004.
- Subsecretaría de Agricultura, “Programa de Acceso Digital para la Agricultura Familiar Campesina: Plan de Acción 2005”. Presentation. December 2004.
- Sulaiman, Idris 2004: Securing e-commerce environment in Indonesia, power point presentation in the e-security task force APICTEL 29th meeting, Hong Kong, 2004
- Suriadinata, Yadi S. A., Survey on Uses of Information and Communication Technology by Indonesian SME Exporters, September 2001.
(<http://unpan1.un.org/intradoc/groups/public/documents/APCITY/UNPAN018841.pdf>)
- Tiff, Jeanne D. Summative Evaluation: Bulgaria Public Computer and Communication Center (PC3) PROJECT, Academy for Educational Development, 2002.
- Timberg, Thomas A., 1999: Small and Micro-Enterprise Finance in Indonesia: What Do We Know? USAID, Jakarta – [www.pegasus.or.id/Reports/01\)%20SME%20Finance.pdf](http://www.pegasus.or.id/Reports/01)%20SME%20Finance.pdf)
- Timmer, Peter, “Operationalising Pro-Poor Growth: A Country Case Study on Indonesia”, October 2004. (www.dfid.gov.uk/pubs/files/oppgindonesia.pdf).
- UNDP, 2004 -1: Regional Human Development Report – Promoting ICT for Human Development in Asia – Realizing the Millennium Development Goals – Indonesia.
- UNDP, 2004-2: Human Development Report - Indonesia
- World Bank, Constructing a New Strategy for Poverty Reduction, Environment and Social Development Sector Unit, East Asia and Pacific Region, October 29, 2001.
(http://poverty.worldbank.org/files/14157_Pov_rdxn_in_indones_constructing_a_strat.pdf).

World Bank, Doing Business: Benchmarking Business Regulation, Webpage (data available is for 2004). (<http://rru.worldbank.org/DoingBusiness/>)

World Bank, “e-Sri Lanka Development Project”, Project Appraisal Document, August 24, 2004. (<http://web.worldbank.org/external/projects/main?pagePK=104231&piPK=73230&theSitePK=40941&menuPK=228424&Projectid=P081771>)

World Economic Forum, Global Competitiveness Report 2004-2005, (www.weforum.org/site/homepublic.nsf/Content/Global+Competitiveness+Programme%5C+Global+Competitiveness+Report)

Bibliography and useful web sites

Arce M-E, Ernberg J.: *Information and Communication Technologies in Nicaragua*, Final report (Sida, October, 2002)

CommUnity, 2000. Unity for communities through communication. A website for community Information and Communication Technology (ICT) projects in South Africa. <http://www.sn.apc.org/community/main.htm>.

Digital Divide network, 2001. <http://www.digitaldividenetwork.org/>.

Ernberg, J., 1998. Universal access for rural development: from action to strategies. http://www.itu.int/ITU-D-UniversalAccess/johan/papers/NTCA_johan.htm.

Ernberg J.: Community information and communication centers -Needs assessment, impact assessment, and component proposal- Final report (World Bank, September 2001).

EU-ESIS, 2001. Master report on the regulatory framework in the Palestine Territories. <http://www.eu-esis.org/esis2reg/PAre7.htm>.

FAO, 1999. Applying the lessons of participatory communication and training to rural telecenters. Special: The first mile of connectivity. FAO, Rome. <http://www.fao.org/waicent/faoinfo/sustdev/CDdirect/CDan0010.htm>.

FAO, 1999. Special: The first mile of connectivity. Advancing telecommunications for rural development through participatory communication. FAO, Rome. <http://www.fao.org/waicent/faoinfo/sustdev/CDdirect/CDre0025.htm>.

FAO, 2000. Applying the Lessons of Participatory Communication and Training to Rural Telecenters,

FAO. <http://www.fao.org/waicent/faoinfo/sustdev/CDdirect/CDan0010.htm>.

FAO, 2000. Information and Communication Technologies for rural development and food security: Lessons from field experiences in developing countries. <http://www.fao.org/WAICENT/FAOINFO/SUSTDEV/CDdirect/CDre0055b.htm>.

FAO, 2000. Rethinking telecenters in the Second World: Knowledge demands, remittance flows, and microbanks. <http://www.fao.org/WAICENT/FAOINFO/SUSTDEV/CDdirect/CDre0055g.htm>.

FAO, 2000. The role of information and communication technologies in rural development and food security, Special, Posted 8 November 2000.

<http://www.fao.org/WAICENT/FAOINFO/SUSTDEV/CDdirect/CDre0055.htm>.

Gómez, R., P. Hunt, E. Lamoureux, 1999. Telecenter evaluation and research: a global perspective. Telecenter evaluation: a global perspective. Report of an international meeting on telecenter evaluation, Far Hills Inn, Québec, Canada, September 28-30, 1999.

IDRC, 1996. Information and telecommunication technologies. The impact of their adoption on small and medium-sized enterprises.

http://www.idrc.ca/acb/showdetl.cfm?&DID=6&Product_ID=499&CATID=15.

IDRC, 1999. Guiding principles of telecenter evaluation.

http://www.idrc.ca/telecenter/evaluation/nn/04_Gui.html.

IDRC, 1999. Telecenter evaluation. <http://www.idrc.ca/telecenter/evaluation/nn/main.html>.

IDRC, 2000. Focus on Telecenters: How can they contribute to social development?

<http://www.idrc.ca/pan/chasqui.html>.

IDRC, 2000. (List of studies and reports by Acacia. <http://www.idrc.ca/acacia/stcat.htm>.

ITU, 1998. World telecommunication development report 1998. Universal Access. International Telecommunication Union. http://www.itu.int/ti/publications/WTDR_98/index.htm.

Kenny, Charles and Anuja Adhar Utz, 2000. Korean Telecommunications Grow at Record Speed, in Development Outreach, Spring 2000.

www1.worldbank.org/devoutreach/spring00/article.asp?id=73

NTCA, 2001. Initial lessons learned about private sector participation in telecenter development. A Guide for Policy Makers in Developing Appropriate Regulatory Frameworks.

<http://www.ntca.org/intl/FINAL.pdf>.

Scharffenberger, G., 1999. Telecenter evaluation methods and instruments: what works and why? Telecenter evaluation: a global perspective. Report of an international meeting on telecenter evaluation, Far Hills Inn, Québec, Canada, September 28-30, 1999.

UNESCO, 1996. Information and communication technologies in development: a UNESCO perspective. Prepared by the UNESCO Secretariat. UNESCO, Paris.

<http://www.unesco.org/webworld/telematics/uncstd.htm>

UNESCO, 2001. The telecenter cookbook for Africa. Recipes for self-sustainability. How to establish a multi-purpose community telecenter in Africa. UNESCO.

Whyte, A., 1999. Understanding the role of community telecenters in development - a proposed approach to evaluation. Telecenter evaluation: a global perspective. Report of an international meeting on telecenter evaluation, Far Hills Inn, Québec, Canada, September 28-30, 1999.

World Bank, 1999. Telecommunications Sector Reform Project, the Republic of Nicaragua. Project Appraisal Document. The World Bank, Washington.

World Bank, 2001. Information Communication Technology (ICT). Sector Strategy Paper. Draft: April 5, 2001. The World Bank Group, Washington.

Annex 10

Glossary

3G: *Third-generation mobile network or service.* Generic name for mobile network/service based on the IMT-2000 family of global standards.

ADSL: *Asymmetric digital subscriber line.* A technology that enables high-speed data services to be delivered over twisted pair copper cable, typically with a download speed in excess of 256 kbit/s, but with a lower upload speed. Corresponds to ITU Recommendation (standard) ITU-T G.992.1

ADSL2: *Asymmetric Digital Subscriber Line 2,* (ITU-T G.992.3 and ITU-T G.992.4). A sequel to the original ITU Recommendation. It allows increased line speeds, new power-saving elements, and extends the reach of the original ADSL specification.

ADSL2+: *Asymmetric digital subscriber line 2 plus,* (ITU-T G.992.5). This revised version of ADSL2 enables increased speeds by increasing the frequencies used on the copper line.

ATM: *Asynchronous transfer mode.* A transmission mode in which the information is organized into cells; it is asynchronous in the sense that the recurrence of cells from an individual user is not necessarily periodic.

Bandwidth: The range of frequencies available to be occupied by signals. In analogue systems it is measured in terms of Hertz (Hz) and in digital systems in bits per second (bit/s). The higher the bandwidth, the greater the amount of information that can be transmitted in a given time. High bandwidth channels are referred to as “broadband” which typically means 1.5-2.0 Mbit/s or higher.

Bit/s: *Bits per second.* Measurement of the transmission speed of units of data (bits) over a network. Also kbit/s: kilobits (1'000) per second; Mbit/s: megabits (1'000'000) per second, and Gbit/s: Gigabits (1'000'000'000) per second.

Broadband: Although there exist various definitions of broadband that have assigned a minimum data rate to the term, it may be defined as transmission capacity with sufficient bandwidth to permit combined provision of voice, data and video, with no lower limit. Effectively, broadband is implemented mainly through ADSL, cable modem or wireless LAN (WLAN) services.

Browser: Application that retrieves WWW documents specified by URLs from an HTTP server on the Internet. Displays the retrieved documents according to the Hypertext Markup Language (HTML).

Cable modem: A technology that allows high-speed interactive services, including Internet access, to be delivered over a cable TV network.

CDMA: *Code division multiple access.* A technology for digital transmission of radio signals based on spread spectrum techniques where each voice or data call uses the whole radio band and is assigned a unique code.

CDMA2000: *Code division multiple access 2000.* A third-generation digital cellular standard based on Qualcomm technology. Includes CDMA2000 1x, 1xEV-DO (Evolution, Data Optimized) and 1xEV-DV (Evolution, Data and Voice). One of the IMT-2000 “family” of standards.

Cellular: A mobile telephone service provided by a network of base stations, each of which covers one geographic cell within the total cellular system service area.

Channel: One of a number of discrete frequency ranges utilized by a base station to transmit and receive information from cellular terminals (such as mobile handsets).

Circuit-switched connection: A temporary connection that is established on request between two or more stations in order to allow the exclusive use of that connection until it is released. At present, most voice networks are based on circuit-switching, whereas the Internet is packet-based. See also *Packet-based*.

Connectivity: The capability to provide, to end-users, connections to the Internet or other communication networks.

Digital: Representation of voice or other information using digits 0 and 1. The digits are transmitted as a series of pulses. Digital networks allow for higher capacity, greater functionality and improved quality.

DNS: *Domain Name System.* The Domain Name System is a distributed hierarchical lookup service. It is primarily used on the Internet and other IP-based networks to translate between domain names and Internet Protocol (IP) addresses.

DOCSIS: *Data over cable systems interface specifications,* (ITU-T J.112). ITU-T Recommendation J.112 for cable modems, originally based on technologies developed by Cablelabs. It specifies modulation schemes and the protocol for exchanging bi-directional signals over cable.

DOCSIS2: *Data over cable systems interface specifications 2,* (ITU-T J.122). ITU-T Recommendation J.122, approved at the end of 2002, is based on a revised version of DOCSIS, originally based on technologies developed by Cablelabs.

DSL: *Digital subscriber line.* See also *ADSL, ADSL2, ADSL2+, SHDSL, SDSL, VDSL* and *xDSL*.

DSLAM: *Digital subscriber line access multiplexer.* A device, located at the central office of a DSL provider, that separates and routes the voice-frequency signals and data traffic on a DSL line.

E-commerce: *Electronic commerce.* Term used to describe transactions that take place online where the buyer and seller are remote from each other.

E-mail: *Electronic mail.* A method of electronically passing messages from one computer user to another, typically over computer networks.

End-user: The individual or organization that originates or is the final recipient of information carried over a network (i.e. the consumer).

ENUM: *Electronic Numbering.* A protocol that is the result of work of the IETF's Telephone Number Mapping working group that provides facilities to resolve ITU-T E.164 telephone numbers into other resources or services on the Internet through a lookup service using the Domain Name System (DNS).

Ethernet: A protocol for interconnecting computers and peripheral devices at high speed. Ethernet can run on several types of wiring including: twisted pair, coaxial, and even fibre optic cable. Ethernet was invented at the Xerox Palo Alto Research Center in the 1970s by Dr. Robert M. Metcalfe. Formal specifications for Ethernet were published in 1980 by a multi-vendor consortium that created the DEC-Intel-Xerox (DIX) standard. This technology was later adopted for standardization by the LAN standards committee of the Institute of Electrical and Electronics Engineers (IEEE 802) and the International Organization for Standardization (ISO). The standard is periodically updated including 100-Mbps Fast Ethernet and 10 Gigabit Ethernet.

FDMA: *Frequency division multiple access.* A cellular technology that has been used in the first-generation analogue systems (i.e. NMT, AMPS, and TACS).

Fixed line: A physical line connecting the subscriber to the telephone exchange. Typically, fixed-line network is used to refer to the PSTN (see below) to distinguish it from mobile networks.

Frequency: The rate at which an electrical current alternates, usually measured in Hertz (see *Hz*). It is also used to refer to a location on the radio frequency spectrum, such as 800, 900 or 1'800 Mhz.

GSM: Global System for Mobile Communications is the most popular standard for mobile phones in the world. GSM phones are used by over a billion people across more than 200 countries, 70% of the world's market. GSM's main competitor, CDMA2000, is used primarily in North America. A major reason for the growth in GSM usage, particularly between 1998 to 2002, was the availability of prepaid calling from mobile phone operators. This allows people who are either unable or unwilling to enter into a contract with an operator to have mobile phones. Prepaid also enabled the rapid expansion of GSM in many developing countries where large sections of the population do not have access to banks or bank accounts and countries where there are no effective credit rating agencies. (In the USA, starting a non-prepaid contract with a cellular phone operator is usually subject to credit verification through personal information provided by credit rating agencies).

Hz: *Hertz.* The frequency measurement unit equal to one cycle per second.

IMT-2000: *International Mobile Telecommunications-2000.* Third-generation (3G) "family" of mobile cellular standards approved by ITU. For more information see the website at: <http://www.itu.int/imt>.

Incumbent: The major network provider in a particular country, often a former State-owned monopoly.

Internet: Global network of interconnected networks that use the Internet protocol (see *IP*).

Internet backbone: The collection of main network connections and telecommunications lines comprising the Internet.

IETF: *Internet Engineering Task Force.* Large open international community of network designers, operators, vendors, and researchers concerned with the evolution of the Internet architecture and the smooth operation of the Internet open to any interested individual.

IP: *Internet protocol.* The dominant network layer protocol used with the TCP/IP protocol suite. The IP protocol suite is maintained by the IETF.

IP telephony: *Internet protocol telephony.* IP telephony is used as a generic term for the conveyance of voice, fax and related services, partially or wholly over packet-based, IP-based networks. See also *VoIP* and *Voice over broadband*.

ISDN: *Integrated services digital network.* A digital switched network, supporting transmission of voice, data and images over conventional telephone lines.

LAN: *Local area network.* A computer network that spans a relatively small area. Most LANs are confined to a single building or group of buildings. However, one LAN can be connected to other LANs over any distance via telephone lines and radio waves. A system of LANs connected in this way is called a wide-area network (WAN). See also *WLAN*.

LLU: *Local loop unbundling.* The process of requiring incumbent operators to open the last mile of their legacy networks to competitors. Similar reference to *ULL (unbundled local loop)*.

Local loop: The system used to connect the subscriber to the nearest switch. It generally consists of a pair of copper wires, but may also employ fibre-optic or wireless technologies.

Main telephone line: Telephone line connecting a subscriber to the telephone exchange equipment. This term is synonymous with the term *fixed line* used in this report.

Mobile: As used in this report, the term refers to mobile cellular systems and to mobile phones.

Packet: Block or grouping of data that is treated as a single unit within a communication network.

Packet-based: Message-delivery technique in which packets are relayed through stations in a network. See also *Circuit-switched connection*.

Penetration: A measurement of access to telecommunications, normally calculated by dividing the number of subscribers to a particular service by the population and multiplying by 100. Also referred to as *teledensity* (for fixed-line networks) or *mobile density* (for cellular ones), or *total teledensity* (fixed and mobile combined).

Pervasive computing: A concept which describes a situation in which computing capability is embedded into numerous different devices around the home or office (e.g. fridges, washing machines, cars, etc.). Also referred to as *ubiquitous computing*. *Pervasive communications* implies that the microchips in these devices are also able to communicate, for instance their location and status.

Protocol: A set of formal rules and specifications describing how to transmit data, especially across a network.

PSTN: *Public switched telephone network*. The public telephone network that delivers fixed telephone service.

QoS: *Quality of service*. A measure of network performance that reflects the quality and reliability of a connection. QoS can indicate a data traffic policy that guarantees certain amounts of bandwidth at any given time, or can involve traffic shaping that assigns varying bandwidth to different applications.

Server: (1) A host computer on a network that sends stored information in response to requests or queries.
(2) The term server is also used to refer to the software that makes the process of serving information possible.

TCP: *Transmission control protocol*. A transport layer protocol that offers connection-oriented, reliable stream services between two hosts. This is the primary transport protocol used by TCP/IP applications. The IP protocol suite is maintained by the IETF.

TDM: *Time Division Multiplexing*. A digital transmission method that combines signals from multiple sources on a common path. This common path is divided into a number of time slots and each signal or channel is assigned its own intermittent time slot, allowing the path to be shared by multiple channels.

Teledensity: Number of main telephone lines per 100 inhabitants. See *Penetration*.

Total teledensity: Sum of the number of fixed lines and mobile phone subscribers per 100 inhabitants. See *Penetration*.

Ubiquitous computing: A term that reflects the view that future communication networks will allow seamless access to data, regardless of where the user is. See *Pervasive computing*.

ULL: *Unbundled local loop*. See *LLU*.

UMTS: *Universal mobile telecommunications system*. The European term for third-generation mobile cellular systems or IMT-2000 based on the W-CDMA standard. For more information see the UMTS Forum website at: <http://www.umts-forum.org/>.

Universal access: Refers to reasonable telecommunication access for all. Includes universal service for those that can afford individual telephone service and widespread provision of public telephones within a reasonable distance of others.

USO: *Universal service obligations.* Requirements that governments place on operators to offer service in all areas, regardless of economic feasibility.

VDSL: *Very-high-data-rate digital subscriber line.* (ITU-T G.993.1). The fastest version of DSL that can handle speeds up to 52 Mbit/s over very short distances. Often used to branch out from fibre connections inside apartment buildings.

VoIP: *Voice over IP.* A generic term used to describe the techniques used to carry voice traffic over IP (see also *IP telephony* and *Voice over broadband*).

Wi-Fi: *Wireless fidelity.* A mark of interoperability among devices adhering to the 802.11b specification for Wireless LANs from the Institute of Electrical and Electronics Engineers (IEEE). However, the term Wi-Fi is sometimes mistakenly used as a generic term for wireless LAN.

WiMAX: Fixed wireless standard IEEE 802.16 that allows for long-range wireless communication at 70 Mbit/s over 50 kilometres. It can be used as a backbone Internet connection to rural areas.

Wireless: Generic term for mobile communication services which do not use fixed-line networks for direct access to the subscriber.

WLAN: *Wireless local area network.* Also known as *Wireless LAN.* A wireless network whereby a user can connect to a local area network (LAN) through a wireless (radio) connection, as an alternative to a wired local area network. The most popular standard for wireless LANs is the IEEE 802.11 series.

WLL: *Wireless local loop.* Typically a phone network that relies on wireless technologies to provide the last kilometre connection between the telecommunication central office and the end-user.

WSIS: *The United Nations World Summit on the Information Society.* The first phase of WSIS will take place in Geneva (hosted by the Government of Switzerland) from 10 to 12 December 2003. The second phase will take place in Tunis (hosted by the Government of Tunisia), from 16 to 18 November 2005. For more information see: <http://www.itu.int/wsisis>.