THE ARKLETON TRUST

Implications of the Information Highway for Rural Development and Education

Report of the Arkleton Trust Seminar,
Douneside, Aberdeenshire, Scotland
February 1996*

by

John Bryden, Tony Fuller and Frank Rennie
(Rapporteurs)

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Preface

The Arkleton Trust was started in 1977 to study 'new approaches to rural development and education' and to 'bring policy makers, academics, and practitioners in rural development and education' into closer contact. In 1985 it set up a research arm, The Arkleton Trust (Research) Ltd, transformed in November 1995 into the new Arkleton Centre for Rural Development Research at the University of Aberdeen.

The subject of this seminar was therefore close to the heart and substance of the Trust's main interest in 'new approaches', and is our second bite at the topic - the first was in 1985. We hope that the report will be useful in helping those who are grappling with the issues of the information highway in one way or another, whether in an educational, research, entrepreneurial or policy context. There is no doubt that the 25 participants, who (in fulfilment of our second objective) came from a wide variety of backgrounds in seven countries, found the discussions valuable for their own work, and formed useful contacts. Subsequent to the seminar an on-line Mailbase List has been established ('arktel') to further the discussions, and a special on-line conference was arranged at the subsequent CRRF-OECD rural employment conference at Coaticook in Quebec in October. We at the Trust are in no doubt that this issue will continue to generate a good deal of interest and activity, on-line and off!

The seminar received generous sponsorship from both the University of the Highlands and Islands Project, itself searching for innovative solutions to distance education using advanced telecommunications, and British Telecom (Scotland) who are the major telecommunications suppliers in the remoter rural areas of the UK. A number of participants also made contributions, often towards travel costs. Without such sponsorship, the seminar could not have taken place, and the Trust is most grateful to all concerned. Particular mention must be made of Robin Lingard of the University of the Highlands and Islands Project, and Bill Furness and Colin Pavey of British Telecom. Both Robin and Colin also attended the seminar.

As always in such intensive workshop-style seminars, the participants and their willingness to interact freely were the key ingredients for success, and our thanks above all goes to them for their time and participation. The participants also made many useful comments on an earlier draft of this report, for which we are grateful.

Elizabeth Lady Higgs, Chairman of The Arkleton Trust

The Participants (Biosketches)

1. Dr Frank Rennie, 25 South Galson, Lewis. Rural Development Consultant, Lecturer Lews Castle College, Highlands and Islands University Project in Rural Studies. Former Chairman Scottish Crofters Union, Arkleton Fellow (Study visit to Highlander Centre Appalachia). Telematics user.
Email: frank_rennie@lews.fc.uhi.ac.uk

2. Dr John Black, Chief Librarian and Professor of Political Studies (now retired), University of Guelph. Responsible for innovative use of IT at University of Guelph, and consultant to numerous libraries and other organisations world wide on this subject. John was a major force behind the development of CoSy computer conferencing system at Guelph in the early 1980's, and a considerable influence on the early development of RURTEL in Scotland. He is a heavy IT user and participant on various international committees. Arkleton Lecturer, 1986 'Telecommunications and Rural Development'.
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3. Prof Tony Fuller, University School of Rural Planning & Development, University of Guelph. Co-author with John Bryden of the Report of the 1986 Arkleton Seminar on New Technology and Rural Development. Special interest in farm household pluriactivity. Author of a number of recent papers on the 'Arena Society'. Formerly Director of the University of Guelph's Rural Development Outreach Project.
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4. Prof Don Dillman, Director of the Social and Economic Sciences Research Centre, Washington State University, Pullman WA, USA. Author of numerous books and articles on the information highway and rural development, most recently 'Rural Communities in the Information Age'. Special interest in the social impacts of information technologies. Currently working with P Salant on a survey of people who have moved in to rural areas of Washington State the goal of which is to determine whether or not information technologies are making a difference to

people's abilities to migrate across state boundaries and especially into rural areas.
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5. Prof Bill Dutton, Director, PICT, Dept of Human Science, Brunel University. PICT (Programme on Information and Communications Technologies) is a UK research initiative launched by the ESRC in 1985 and focused on exploring the social and economic issues surrounding advances in information and communication technologies. It involved six centres in Britain and numerous other researchers in the UK and abroad, and was completed during 1995. The PICT project ended in 1995, and Bill is now back at the Annenberg School for Communication in Los Angeles.
Email: wdutton@bcf.usc.edu.

6. Prof John Bryden, Programme Director, The Arkleton Trust. Organiser of the Trust's 1986 seminar on New Technology and Rural Development. Initiator and director of the Trust's pilot project RURTEL, a computer conferencing system for rural researchers and practitioners based in the Highlands and Islands (1986-). Research Director, evaluation of the HIDB/HIE/BT pilot project on Teleservice Centres in the Highlands and Islands. Joint author, report on Employment Implications of Advanced Communications Technologies for EC Commission. Joint author, report on distance education and training and regional development in rural areas for EC Commission's Human Resources Task Force. Director of 16 country research programme, Rural Change in Europe, 1986-92. Contributions on future of rural areas for Europe 2000 and Europe 2000 Plus projects of EC DG-16. Participant, Carrefour on Science Technology and Culture, Vezelay (Future of Rural Areas) and Leiden (Future of Europe). Research Director, Evaluation of the Economic Impact of the Highlands and Islands Telecommunications Initiative, 1994-95. Chair, Future Prospects Group, European Rural Observatory, 1995- .

Professor and Chair of Human Geography at the University of Aberdeen, and joint Director of the Arkleton Centre for Rural Development Research.
Email: jbryden@abdn.ac.uk

7. Prof Mark Shucksmith, University of Aberdeen. Recent research work includes various projects within the European research programme on rural change: farm household pluriactivity and structural adjustment; ESRC funded study of "Changing attitudes to residential development in the Countryside"; DOE funded study of "Rural housing markets in England"; Rowntree funded study of "Rural deprivation" and various others. Mark has been vice-Chairman of Rural Forum Scotland, and is currently working with Bryden, Rennie and others on a proposal for a decentralised rural research centre for the Highlands and Islands, and advanced courses to be delivered by distance education using new technology. Professor in the Department of Land Economy, University of Aberdeen and now joint Director of the Arkleton Centre for Rural Development Research at the University.
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8. Elizabeth, Lady Higgs, Chairman of Trustees of The Arkleton Trust. Chairman Oxfordshire Rural Community Council. Participant in the Trust's 1986 seminar on New Technology and Rural Development.

9. Caroline Higgs, Hon. Secretary, The Arkleton Trust. Domestic Burser.

10. Mr Robin Lingard was educated at Cambridge University. From 1963 to 1987 he was in the UK Civil Service, working chiefly in Ministries responsible for aviation, technology and industrial development. His last two appointments were in the Cabinet Office, dealing with enterprise and employment policies and in the Department of Employment, dealing with policy on small firms and on tourism. In 1988 he moved to Scotland to become an executive board member of the Highlands and Islands Development Board.

When that organisation became Highlands and Islands Enterprise (HIE) in 1991, he became HIE's Director of Training and Social Development, responsible for human resource and community development programmes across the region. Since November 1993 he has been HIE's Project Director for the University of the Highlands and Islands Project. From 1988 to 1992 he was also a board member of the Scottish Tourist Board.
Email: robin_lingard@fc.uhi.ac.uk

11. Tim Walter, The Aspen Institute, Washington DC. Director of the Rural Telecommunications Initiative. Aspen is a major US think tank, with a wide range of programmes, Urban and Rural. It has received support from Ford Foundation, Kellog, Apple, and others for various Rural Programmes. It was the US partner with the Trust in the three-year exchange programme on Rural Policy issues, funded by the Ford Foundation, the USDA, and the Donner Canada Foundation.
Email: hn1005@handsnet.org *or* timothy@aspeninst.org

12. Colin Pavey, British Telecom, Aberdeen. Colin is currently Programme Manager of *IT Action* to which he was appointed in early 1994[1]. He has been involved in the development of rural telematic applications since 1986 primarily through his role as Marketing Manager for the Highlands and Islands Telecommunications Initiative, which by 1992 had provided modern digital services including ISDN to businesses throughout the region. Notable programme successes include the establishment of a number of teleservice/call centres offering employment to around 500 people during the next couple of

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1 *IT Action* is a four year programme with BT and Highlands and Islands Enterprise working in partnership to encourage the application and exploitation of Information and Communications Technologies to generate economic activity. The two strands of programme activity are awareness raising/exploitation, and infrastructure development (through to broadband). BT has two primary reasons to be involved; the area is an ideal test bed and case study for the development and application of rural telecommunications technologies, and it is an opportunity to maximise the return on investment in a rural and remote area that has relatively few customers and extraordinarily high provision costs.

years, and the development of a number of ICT based SMEs both existing companies and business start-up.

In 1992 he was appointed as a Director of Network Services Agency, a BT subsidiary based in Inverness, delivering computer conferencing, e-mail, file transfer and Internet services to customers throughout Europe.

Colin has been active in the development of teleworking and call centres in the UK generally, particularly in Scotland and has presented a number of papers on the subject. He was a member of the project team that ran an experimental twelve month home working pilot for BT Directory Enquiry operators based in Inverness. On the basis of the experience, the concept is being extended to other "process" jobs in BT.

Prior to 1986, his experience in the telecommunications industry was in the International Division of BT and its predecessor companies where he worked in Sales and Marketing since joining the company in 1965.
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13. Michael Wolff, The Dower House, Lethan, Nairn. Teleworking entrepreneur - behind two recent teleworking enterprises in the Highlands and Islands - one at Nairn (Hoskyns Ltd) and one on the Isle of Bute. Recently a prime mover in establishing 'Highland Trail', an organisation established with 20 food companies in the Highlands and Islands to market their products on the World Wide Web.
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14. Sheila McCaffery, is Managing Director of KITE (Kinawley Integrated Teleworking Enterprise Ltd). She is a director of the TCA - The UK Telework Association, and a Chair of TeleWork Ireland - the equivalent NI organisation.

By day Sheila works within the health service - she is employed as Fund/Practice Manager in a general medical practice in Lisnaskea, Co

Fermanagh. On one occasion when asked how she can cope with these two jobs - she quipped that 'one is her nine to five, while the other is her five to nine job'.

KITE. Some capital funding was obtained from the EU and Local Government, along with substantial personal investment, a Telecottage was built. KITE obtained some funding under NOW and a training programme for teleworkers was successfully delivered, which has led to the creation of fourteen new jobs in Kinawley. One of the features of the Telecottage is an onsite crèche, this is the only registered pre-school child care facility in Fermanagh.

The Telecottage opened its doors on 21 November 1993. It is now an established business in County Fermanagh. Currently, teleworkers are working on a range of contracts, for clients in Northern Ireland, Britain, Europe and USA. Along the way Sheila has picked up the Business and Professional Women's award for The Most Enterprising Women in Northern Ireland 1994. The BBC Northern Ireland profiled Sheila in a documentary series last spring called Home Truths, the programme which featured Sheila was called 'Bringing Technology To Kinawley'.

Sheila, currently, is an advocate of an American Government programme called AMBIT, and is working on technology transfer from the US to Northern Ireland and the border counties as part of the peace programme in Northern Ireland.

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15. Ms Maggie Symonds, Cromarty, Scotland. Maggie Symonds has a background of Adult and Further Education management and teaching. Whilst living in small island communities in Orkney, she worked on and

developed projects using participative methods of on-line learning, while also having a close involvement with the Community Enterprise movement Her interest is in bringing technologies together to meet the needs of learners and communities, and in developing empowerment via telematics. She has considerable experience of European projects and has been a member of the Board of Orkney Enterprise Company and of the Association of Community Enterprises in the Highlands and Islands.

Now living in Cromarty, she is a partner in SE&D, a consultancy which furthers global access to telematics, to overcome distance disadvantage, and explores the links between the Internet, WWW and the burgeoning FirstClass community. SE&D has recently collaborated with the Scottish Council for Educational Technology to enable practitioners throughout Scotland to develop mutually useful electronic links.

Some of Maggie's recent projects include: Carbon Copy on-line learning for community enterprises; NSA on-line collaboration for H&I Forum Board; Gemini: Electronic Writing Boards to overcome insular disadvantage of primary pupils; ENACT: supporting learners with disabilities using remote access software and CMC; Highland Euroform: developing a consortium of colleges and trainers in the Highlands and Islands to further collaborative projects; Business Advantage:on-line simulation to enhance Euro assistance for sme's

Her vision includes cheap and easy access to on-line communications for all users in the Highlands and Islands, whether education, community or business; a lowering of the frontiers in the UK between the various educational sectors, from Continuing Education, to Primary and to Higher and, globally, a better understanding of successful methodologies for on-line teaching and learning. Has recently established CALICO a FirstClass server linked to the Internet, and available for subscribers.

Email: maggie_symonds@cali.co.uk

16. Mr Peter Adena. Peter is from the small town of Norden in East Frisia, Germany and has a background in the social sciences, adult education and community development. He is Director of the Volkshochschule Norden, originally working in the field of adult education, and combined since the early 1980's with a private company (GAG Ltd), which is also in public ownership. Both institutions aim at rural development by means of coordinating social work, further education, technical advice/consultancy and regional innovation, and further details are given in the Annexes.
Email: VHS-Norden@gag.geonet.de

17. Dr Heather Clemenson, Rural Secretariat, Agriculture and Agri-Food Canada (AAFC). Among its many activities, the Rural Secretariat is monitoring the role of the Information Highway in rural Canada. Like most federal government departments, AAFC is endeavouring to provide a new type of client service for dissemination of information, through an Internet WWW site, as well as via BBS, voice and fax-back services. The Rural Secretariat and the Canadian Agriculture Library are also undertaking a joint project known as the Canadian Rural Information Service (CRIS) to provide a clearing house of information on rural Canada. One vehicle for dissemination of information through CRIS will be a WWW site. Heather was also responsible for developing the on-line conference activity as part of the Canadian Rural Restructuring Foundation's International Conference on Rural Employment held in Coaticook, Quebec in October 1995.
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18. Prof David Wood, Dept of Psychology, University of Nottingham. David is Director of CREDIT- The ESRC's Centre for Research into Development Instruction and Training. Among many other things, CREDIT has pioneered a novel software system designed to help undergraduates learn basic scientific principles more quickly and stimulate them to make new discoveries.
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19. Mr. Heimo Keranen. University of Oulu, Finland. Leader of Telehouse Project in Kainuu (3 small villages).
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I. Introduction

> "The information superhighway appears to be a political slogan that can mean all things to all people. It is portrayed as a significant part of the solution to American education, health care, employment, productivity, trade and even environmental problems. Once it is defined, it would be likely to create losers as well as winners. Some interesting battles can be expected then." [Martin Elton, Professor of Communications at New York University, cited in Dutton et al 1994]

The aim of the 1995 Arkleton Seminar was to explore the significance of the 'Information Highway' for rural development and education, specifically to see whether or not we could identify practical ways in which rural people could take advantage of some of the new opportunities emerging from the Information and Communications Technology (I&CT) 'revolution' and avoid some of the fears of the sceptics.

The Arkleton Trust has used advanced communications for its work since 1984, and has used 'teleworkers' since 1987. It is therefore a relatively early example of an enterprise, albeit a charitable enterprise, which advanced information and communication technology has allowed to function in a rural area.

As early as 1986 the Trust held an international seminar on New Technology and Rural Development[2]. The seminar brought together a series of case studies of the application of telematics in rural areas, and proved to be a valuable source book for both researchers and practitioners in the field. Later that year it set up a pilot computer conferencing system aimed at rural practitioners and researchers. This was called RURTEL, and it is now run by Network Services Agency Ltd, a subsidiary of British Telecom (BT).

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[2] Bryden, J M and Fuller A M : New Technology and Rural Development. The Arkleton Trust, Enstone, Oxon. 1986.

RURTEL was the first public access telematics system both located in a rural area and aimed specifically at rural users in Europe. At one time it had users in 13 countries. It was one of the early experiments in the field, and was used to promote BT's internal case for a subsequent investment of over £16 million to upgrade the telecom network in the Highlands and Islands to digital standards. It also helped to establish the principle of local call rate access to the digital communications network throughout the region. This experiment was evaluated in 1989 (Misener, 1989).

From 1990-93, Arkleton's research arm evaluated the Pilot Teleservice Centres Project supported by Highlands and Islands Enterprise and BT. This project supported six such centres in remote parts of the Highlands and Islands, and the evaluation report is publicly available (Bryden, Black & Rennie, 1993).

In 1994, Arkleton undertook a study of the Employment Implications of Advanced Communications Services for the European Commission, DG-13 (Arkleton Research with Sociomics Ltd, 1994).
At the time of the 1995 seminar, Arkleton was undertaking an evaluation of the impact of the Highlands and Islands Telecommunications Initiative for Highlands and Islands Enterprise. This was completed in October 1995.

In the 1995 seminar we re-examined the subjects examined in the 1986 seminar. This provided an opportunity to review the changes which had taken place in the intervening nine years, and to discuss the implications for research, action, and policy.

1986 Conclusions

The main conclusions of the 1986 seminar were as follows:-

(i) Rural people **can** benefit from the applications of new computer and communications technologies. The main

reasons for this lie in the 'distance shrinking' nature of these technologies, and the increasing quality and decreasing costs of telecommunications and associated computer hardware.

(ii) Rural applications must be driven by need rather than by technology. A clear articulation of problems, needs and opportunities will lead in turn to a clear expression of 'demand' for different types of application.

(iii) The drive for mass experience - both in schools and out of them - will be crucial in articulating these applications. The most appropriate ways in which this experience and involvement can be brought about will be culturally dependent, but in general people should feel comfortable in the selected environment, find it easily accessible and familiar as a place of informal meeting, recreation or learning. There is indeed a case for experimentation in this area, but the lessons of experience to date should be examined carefully.

(iv) Public, private and voluntary sector activities can now be economically and effectively undertaken and developed on a decentralised basis using such technology, and this includes important areas of higher education and research. This point needs to be made repeatedly and forcibly in order to overcome traditional obstacles to such processes. Those responsible need to re-examine their systems of organisation and hierarchy with a view to such decentralisation. This is entirely consistent with the development of democracy in society - in itself an important goal for development, rural or urban.

Some initiatives since 1986

It is worth recalling that a decade ago the Internet was in its infancy, linking about 1,000 mainframe computers in government and academic establishments, mainly in the US. Now, according to a recent report in the Financial Times, the Internet is said to link some 50 million users and 4 million computers or 'hosts' worldwide, and this is growing at an exponential rate.

In this period, both the technology and the infrastructure has been transformed in many rural areas of Europe and North America, and the costs of using telematics has declined in real terms. Many countries and provinces in Europe and in other parts of the 'industrialised' world are rapidly approaching a situation where access to high speed digital communications will be almost or even completely ubiquitous.

Starting in the early 1990's, the EC has had a special research and development programme on 'Opportunities for Rural Areas in Telematics' (ORA), and other programmes focusing on applications on distance education and training. The European Commission's Fourth Framework Programme for research and development (R & D) for 1994-1998 includes some US$ 3.8 billion to support advanced communications R & D and the evolution of underpinning technologies as well as the development of distance learning, health care and other services of public interest.

In the UK, the Economic and Social Research Council has supported a major Research Programme on the Social and Economic Implications of Telecommunications Technologies (PICT) over the past decade, and a Research Centre on Education Development Instruction and Training (CREDIT) at Nottingham University for the past three years. This Centre has focused on technology based learning.

In 1989, the Highlands and Islands Development Board (which subsequently became Highlands and Islands Enterprise) and British Telecom launched the Highlands and Islands Telecommunications Initiative (HITI). The HIDB put £5 million towards the costs of BTs £16m plus investment in the digital telecommunications network in the Highlands and Islands, allowing implementation of the Integrated Digital Services Network (ISDN) by 1994 in one of the most sparsely populated rural regions in Europe. Also in the Highlands the Lambda project of the EUs RACE telematics research programme is developing multimedia terminals & video phone links for remote communities to access council services. In Grampian Region, the Grampian Telematics Initiative has also led to public and private sector developments.

Other European countries such as Finland (TEKES, Ministry of Labour), Sweden, Norway (SINTEF), Denmark (the Danish Technology Institute), Ireland (AFT and others), Luxembourg, France and Spain have also been active. A number of initiatives have taken place to familiarise and train rural people for the 'information age', and to encourage the development of 'distance working' in various forms using telematics. Distance education has also taken on new dimensions, and an increasing number of initiatives utilise telematics for course delivery and student support.

In the US, the Aspen Institute launched a special Rural Telecommunications Initiative in the late 1980s, and, since 1987, has collaborated with Northern Telecom to establish the Institute for Information Studies. At government level, the High Performance Computing and Communications Program and other initiatives with similar scope to the EC's programme, has a planned expenditure of US$2 billion per annum. Recently the National Public Telecomputing Network received a federal grant of $900,000 to spur development of rural community networks. Twenty electronic community networks in rural areas are planned, each offering citizens free or low-cost access to electronic mail, a broad range of professionally produced information services, and the Internet. The grant comes from the National

Telecommunications and Information Infrastructure Assistance Program, under the auspices of the National Telecommunications and Information Administration (NTIA), U.S. Department of Commerce. The National Public Telecomputing Network is a pioneer in building electronic community networks throughout the U.S. and overseas.

Industry Canada (the Federal Ministry for Industry) has recently reviewed its own policies on the Information Highway, and is also investing heavily, for example through the CANARIE project (Canadian Network for the Advancement of Research, Industry and Education) which has $80 million (Canadian) invested by the Federal Government. Canada also has one of the fastest growing community networks, services provided at local community level, and linked to the Internet.

Japan's Nippon Telegraph & Telephone Company has announced its intention to wire every school, home and office with fibre-optic cable by 2015, at a cost of US$150-230 billion.

It is clear from these few examples that much has happened in the past decade, and particularly the last five years. Although much of the above concerns research and infrastructure, there is also some evidence of practical commercial and local community activity to apply the technology. At the policy level, much has been made of the new possibilities for work and leisure arising from the Information Highway, a term which has been specifically used for example in the Bangemann report (EC, 13 June 1995) and EC's White Paper on Employment (EC, 1993), and in a similar recent paper in Canada (Canadian Information Highway Advisory Council, 1994). It is no accident that the Information Highway was one of the planks in Clinton's presidential campaign or that the Group of Seven (G7) industrialised nations devoted a whole meeting (in Brussels) to the subject at the very time of our seminar (European Commission, 1995).

The G7 partners agreed 'to collaborate on the basis of eight core principles in order to realise their common vision of the Global Information Society'. These were:-

"promoting dynamic competition
encouraging private investment
defining an adaptable regulatory framework
providing open access to networks

while

ensuring universal provision of and access to services
promoting equality of opportunity to the citizen
promoting diversity of content, including cultural and linguistic diversity
recognising the necessity of worldwide cooperation with particular attention to less developed countries." (European Commission, 1995)

On the basis of these eight policy principles, they decided to implement a series of pilot projects designed to promote innovation and the spread of new technologies. The pilot projects are intended to address international issues such as environmental protection, and to contribute to the growth and competitiveness of industry and commerce (especially small and medium sized enterprises).

These projects fall within four themes, namely (ISPO, 1995):

* a global inventory of applications and studies, including an electronic forum.
* projects addressing the needs of individuals, such as cross-cultural education and training;
* projects addressing the needs of the economy, such as a marketplace for SMEs;
* projects addressing issues of public concern, such as environment and natural resource management.

Nevertheless, it is also clear that the development of the infrastructure is occurring at a rate which so far outpaces the growth in utilisation by rural people, small businesses and organisations. Although there has been little research into the social and economic impacts of these new technologies in rural and remote areas, there is enough evidence to suggest that some types of rural area, and some groups of people in these areas, are not yet experiencing benefits from it, and indeed may be suffering from associated restructuring of work and other aspects of life - in other words their jobs may be disappearing, and either being replaced by lower paying, often part-time, manual or service work, or not being replaced at all. The technology itself is not 'neutral' in its impacts, since these are mediated through economic and social structures. There are contradictions in the principles agreed, for example between the notion of information as a public good which can provide equality of opportunity and that of protecting intellectual property rights and encouraging private investment.

More attention needs to be paid to these uneven effects on geographical space and society, and this set of issues formed an important part of the debates at the seminar.

II. The Information Highway and Rural Development

In simple terms, we are talking about the computer chip and its impact on Information and Communications Technologies (I&CT), and particularly the **combination** of Information and Communications Technologies. What this combined technology has done is to reduce radically the costs, and increase the speed and feasibility, of moving large amounts of information about the globe. The Information Highway has major economic, social and political significance, at the very least as great as the introduction of motorised transport at the end of the 19th Century, but with some major differences. The transport revolution did indeed enable a considerable expansion of trade and 'globalisation'. However, it also encouraged massive migratory movements, urbanisation and centralisation. At least in principle, the "revolution (which) is carrying mankind forward into the Information Age" (European Commission, 1995) requires and allows "traditional organisational structures to be more flexible, more participatory and more decentralised", and enables more and more people to choose where they live rather than being forced to move to urban centres close to trade routes.

In infrastructural terms the Information Highway depends on the micro chip and optical fibre, the satellite and advanced radio communications, and digital switching systems. In software terms it depends on access tools, communications packages, web browsers and so on. In hardware terms it also relies on networks and networks of networks able to communicate using common protocols, and low-cost local 'points of presence' for Internet access. In market terms it depends on information as a resource and a commodity which can be exchanged for cash, improve the quality of life, or empower people and improve and extend democracy. It challenges hierarchies whose power depends on limiting access to information, whether in the public, social or private spheres. The Information Highway is the medium which may allow our credit cards to be checked, our spare parts to be ordered from just-in-time manufacturers, our home banking, our directory enquiries, our remote searches of libraries and databases, live TV pictures to be transported

from the other side of the globe, the buying and selling of futures options on the Tokyo market, and so on.

There are many such networks and networks of networks, heavily exploited by the financial sector and the media, by researchers, by international companies, by governments, and increasingly by citizens. The best known is probably the Internet, itself a network of networks using common protocols for the exchange of information between host computers which are the link with users. For the academic and research establishment it is the global standard, and increasingly it is also the standard for community networks and for various kinds of cyberspace associations and business ventures. Through the Internet we have services like World Wide Web (WWW), Gopher, Mailbase, Mail, ListServs, Telnet, FTP etc.

Allusions to telecommunications infrastructures which are able to deliver all kinds of electronic information and communications services commonly refer to the 'Information Superhighway'. Bill Dutton and his colleagues in the ESRC's PICT programme have identified the defining characteristics of this 'superhighway' as:-

(i) "a broadband telecommunications service with the ability to carry enormous quantities of information at high speed; the capacity for two-way (interactive) communication; and the ability to deliver any media, including video, audio and text[3];

(ii) the infrastructure ... should ultimately be able to provide a seamless interconnection between many networks. It is unlikely to be a single homogenous network;

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[3] 'Broadband' refers to the speed and data capacity of the links. The bandwidth required for digital telephony, high speed fax, and the videophone is 64K bits per second; that for uncompressed broadcast TV is between 1100 and 2200 times higher - ie 70 to 141Mega bits, per second, impossible on a twisted pair of copper wires, feasible on coaxial cable up to about 3km, but beyond that requiring optical fibre links. (Dutton et al 1994: Figure 1.)

(iii) the network of networks would evolve by interconnecting many existing and new public and private information 'highways, main roads and avenues'. Some countries could evolve relatively quickly to more advanced capabilities because they already have many coaxial links as well as traditional copper wires at local levels, together with optical fibres for trunk routes. A more revolutionary leap forward from basic capabilities would be needed elsewhere.

(iv) regulations and standards should promote an open environment in which any company could provide any service to any person." [Dutton et al, 1994]

These defining characteristics are important because they reflect the current state of thinking in academic and policy circles in Britain at least, and probably elsewhere in western Europe and North America as well. However, the seminar discussion suggests that the second sentence in (iii) should start 'some regions in some countries'. The point is that rural areas even in otherwise well-endowed countries are unlikely to be in the same position as areas in and around urban centres, since they often do not have 'many coaxial links', and are commonly served by twisted pairs of copper wire. This has implications for the final point about regulations and competition, since in sparsely populated areas the economics of providing the necessary infrastructure may require a (regulated) monopoly provider who can capture revenues from all information services. We would not, of course, expect rural concerns to dominate discussion of I&CT or broadcasting regulation and policy, but rural people must therefore be very vigilant indeed if they are to ensure that the overwhelming attention to urban and 'National' issues does not have serious and adverse consequences for them. We return to this point later.

We believe it is highly significant that, probably for the first time, **social organisation** is developing in the 'cyberspace' of the Information Highway. We recognise that these remote 'societies' or 'communities'

develop norms, rules, trust and other elements of social organisation across social and national boundaries, and without personal face-to-face contact. If we imagine the 'traditional' concept of rural communities as being about 'belonging' to certain physical and social spaces, we now see that these new forms of social organisation create essentially a-spatial forms of 'belonging' which are not geographically bounded. We know from Internet experience that the kinds of social relations thus established are not the same - the impersonal nature of cyberspace can at times lead to 'intemperate' communications (such as 'flame wars' in which a group member may be attacked for a position or statement using devices like a sustained barrage of electronic mail). We have yet to imagine the eventual consequences of this for society as a whole, let alone for rural societies and individuals. However, we can already detect the use of this technology to create 'horizontal' alliances between minorities, or to build international support for local protest movements[4].

Why is the I&CT revolution important for Rural development?

The most obvious impact of I&CT has to do with the reduction or elimination of the effects of physical distance, and hence, it seems, the logic of agglomeration or clustering of enterprises, public authorities, and people. It is immediately evident that this is of disproportionate importance to rural areas, or at least those rural areas with access to the Information Highway.

In Section III we refer to economic restructuring, globalisation and the changing labour market. It is now widely believed (if not always supported by facts) that low skilled work, or low skilled components in the chain of production, is moving to low wage countries, wherever possible. To take one example, the design of a magazine, and its

[4] The potential of such 'horizontal' networking between rural interests and groups was noted by Bryden and Fuller (1986).

content, may well be done in W Europe or N America, but the printing is more often done in the Far East, and the creation and updating of the mailing list and dispatch may be undertaken in Ireland. This is also happening in some skilled areas, especially where these have been artificially protected by professional interest groups in the west. The emergence of international engineering design teams operating on the Internet is an example of this. Robert Reich and many others have argued that these trends will continue. Indeed, recent projections in Finland estimate that by the year 2000, the "content of work in Finland will include: 93% information work, 5% industrial work and 2% in primary production".

Rural areas, because they tend to depend disproportionately on low-skilled, low-wage activities, rural areas have suffered from this restructuring process and seem likely to continue to suffer in future. Enterprises in many sectors are engaging in the global and European economy as a means of survival, carving out niches in terms of products and expertise. I&CT plays a key role in the information flows which make this possible. For example, Highland Trail is a new venture marketing the products of 20 small companies in the Highlands and Islands globally on the World Wide Web. Therefore, in the present context of globalisation at least, the key issue for enterprises in rural areas is about maintaining competitiveness and innovating products and processes.

Telework is probably a relatively minor issue by comparison, even though it will become more important in the future as a more environmentally, economically and socially sustainable alternative to commuting (European Foundation for Living and Working Conditions, 1994). One firm in the Highlands & Islands of Scotland reckons it will have 1000 teleworkers by the year 2000. Others with similar ambitions exist. Such larger scale developments often link to the restructuring of businesses in the retail, banking and insurance sectors, and in particular the development of tele-shopping, airline reservations, tele-banking and tele-insurance. These last require the parallel development of 'call

service centres' which process customer telephone orders and payments, and the location of these service centres is increasingly freed from spatial constraints by I&CT.

KITE, a rural telework enterprise located in Co Fermanagh, N Ireland, was developed by one of the participants at the seminar. The KITE centre was set up to be a focus for both economic and social regeneration of this rural, isolated and deprived area of Northern Ireland. The KITE centre currently employs fourteen people directly. Current work includes overnight processing work for a US corporation located in Silicon Valley, California, medical data input, remote conference and event management, in addition to a range of administration services for 'virtual' offices. Employees enjoy work on a flexible and job share basis which includes onsite day care provision for their pre-school children.

Lasair Ltd in the Outer Hebrides employs 60 teleworkers abstracting articles from business magazines, health journals, and other sources, and putting them in electronic form for a worldwide market[5].

BT provides a computer help-desk for all its employees in the UK at three service centres, one of which is in Thurso at the northern tip of Scotland. The Thurso enterprise employs about 100 people at the present time.

Many other examples exist. However, much of this telework (but not all of it) is in relatively low skilled activities, vulnerable to wage-cost competition from abroad.

In principle, I&CT also offers important new opportunities for participation and democracy in rural areas. In particular it opens up new possibilities for direct democracy, improvement of citizens access to

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[5] Recently, Lasair has won a contract from the Metropolitan Police in London to create a forensic science database, and a further contract to convert 100 years of the Scots Law Times to digital format for eventual publication on CD-ROM. West Highland Free Press, 3.11.95.

public and other information, participation of rural people in regional, national, European and global activities. In a benign scenario at least, we can envisage a growing use for these technologies in the development of civil society across social and national boundaries. In Britain, the reorganisation of local government provides a window of opportunity for this type of application of I&CT. However, we can also envisage alternative scenarios, where the technology can be used for greater centralisation, and greater central control.

Remote health diagnosis, using I&CT, seems to be allowing the retention of many small rural health care facilities, important for rural welfare and jobs as well as for containing the cost of health services in rural areas. The recent Technology Foresight Reports in the UK suggest that innovation in medical science and practice will be one of the most important areas of activity in the foreseeable future, and I&CT will play a major role here, of particular importance both for the economics of health care for rural people, and for their health and welfare (especially those in remoter and more sparsely populated areas). Already there are important initiatives in the health sphere in peripheral parts of Scotland, Finland, Norway, Canada and Sweden. These include teleradiology, use of endoscopic video equipment for remote diagnosis, and use of video conferencing for nursing education and remote consultation. The remoter rural areas will often be the first to develop such new methods because they face the most formidable problems and costs in either moving patients to specialists or vice-versa.

I&CT has already been used at all levels of education in rural areas. Given the new demands for lifelong learning, and the acquisition of new skills, not to mention budgetary constraints, we must expect further developments in distance education. In North America, the UK and much of Europe there will be a computer terminal on every school desk in the foreseeable future, and many of these will be linked to networks, even the Internet. Almost one quarter of Canada's 16,000 primary and secondary schools are now networked on-line. In December 1995, the Ontario Government announced that it hoped to have a computer on

every secondary school student's desk by the year 2000. The I&CT revolution offers new scope for access to education and training, and for improvements in quality of service, for rural people in particular. The proposed University of the Highlands and Islands intends to take the form of a decentralised structure, making maximum use of Information Technology & Telecommunications (IT&T) both for administration and for delivery and support of remote students using distance learning packages. In this it will build upon the already substantial experience of the Open University. Again, however, I&CT will not automatically lead to improved quality of education in rural and remote places - there are considerable challenges ahead in terms of both didactics (the move from teacher-centred to learner-centred processes), support mechanisms, and subject matter content and design (Bor, 1994).

Of course, as we have already noted, I&CT is bringing with it job losses in rural as well as urban areas - through automated banking, home shopping, remote monitoring, and digitalization of telephone exchanges, as well as through the associated restructuring of private enterprises and in due course public authorities. The question is whether or not such changes are likely to happen anyway, and whether rural areas and people have the power and will to change the course of events. In either case, however, one of the challenges is to identify and take advantage of the new opportunities which are being opened up on the one hand, and to find ways of minimising adverse effects on the other.

III. The Context: Changing Rural Economy and Society

The period from 1986 to 1995 is likely to be considered one of the most dramatic in terms of global change in the twentieth century, which is itself already characterised by technological innovation and the development of mass culture. Since the first Arkleton Seminar on New Technology and Rural Development in 1986, the western industrial nations in particular have experienced growing impacts from global restructuring. By identifying the main trends of change in this period, the participants in the 1995 seminar felt that some of the consequences of global restructuring could be traced through their effects on rural employment, community, and education.

Global restructuring, although a process which started in earnest with the development of mechanised transport in the 20th century, took on new intensities and dimensions in the 1986 to 1995 period. These years included major geo-political changes such as the demise of the Soviet Union and the end of apartheid in South Africa, as well as economic restructuring based on the trade liberalisation effects of the Uruguay round of GATT and the formation of mega-trading blocks; an enlarged European Union, the North American Free Trade Agreement (NAFTA), and the South American Exchange Agreement (MERCOSUD). In global terms it was a recessionary period with high unemployment in the old industrial nations and a prevalence of constraint in fiscal policy with national debt-reduction the main goal. This led to the ubiquitous phenomenon of "down-sizing", an attempt to reduce the size of governments, to control budget deficits, and to reassess costly and sometimes less effective state programmes. The role of national governments has declined further as international economic links have developed, mainly through multinational corporations and the further expansion of global financial markets, but also through the development of supra-national institutions such as those of the European Union.

Included in the main trends of globalization are the restructuring of markets, particularly the capital and labour markets, and the concomitant effects of segmentation in the production process. Goods that were once fashioned and finished in one location are still assembled

in one spot, but their component parts are made in several different locations. This has meant that capital has gone off-shore in search of low-cost labour and has resulted in the loss of many manufacturing jobs in rural areas. Some component makers have come into rural locations in search of reliable labour, but the net effect has often been a loss in manufacturing jobs (Glasmeier, 1993). This, coupled with the decline of primary-sector employment, especially in agriculture, forestry and fishing, has meant the restructuring of rural labour markets. Service-sector employment has increased globally and with it the opportunities for female employment. Although these trends are universal, some seminar participants felt that they had largely played themselves out in many rural areas, whilst others felt that there was much more to come.

Particularly noticeable in the 1986 to 1995 period has been the restructuring of the labour market in rural economies with a decline in "real jobs" and a growth in part-time and seasonal work which is often insecure and poorly paid. This is especially true of rural tourism which has been touted as a panacea for rural development in many regions. Much of the employment in the new rural economy is low-waged and is occupied by women. In addition there has been substantial growth in the informal economy as well as a rise in self-employment. These trends reflect a diversification effect in regional development and the impacts of down-sizing the role of government in the provision of social programmes. The latter policy has given rise to a new wave of volunteerism in society where semi-professional providers, for modest fiscal rewards, are providing secondary social support networks in many rural areas.

A further feature of many rural areas is their vulnerability to processes of globalisation and restructuring. In the first place, they still, in general, have a highly skewed economic and employment base, despite the decline in the primary sectors. In the second place, this employment base can be very narrow in many rural areas, with a high dependence on a relatively small number of firms, or even a single industry. In the third

place, although there has been a diversification into the service sector, this has tended to be in relatively low value personal services and tourism, rather than in the higher value finance and business services, including information services. Fourthly, some more peripheral rural areas, in particular, remain highly dependent on government employment and social transfers. Finally, other rural areas are highly dependent on commuting to urban areas for employment, a practice facing challenges as a result of concerns about the environmental impacts of private transport[6]. Lest these five issues of vulnerability should appear too negative, we shall see later that rural areas can also call on some new strengths, also created by globalisation and new developments in I&CT.

Another aspect of this period of great economic and social change has been the rise of environmentalism, which has matured from having the status of a pressure movement to garnering international political concern. This was encouraged by the Brundtland Commission (World Commission on Environment and Development, 1987), which gave us one of the important concepts of the period, that of sustainable development. In turn this has led to the notion of sustainable rural communities (Bryden, 1994), since many rural places, because of the predations of global restructuring, have become increasingly vulnerable to decline. Communities that are resource-based, such as fishing areas in Atlantic Canada and extensive wheat-farming areas in the central plains of North America, are cases in point. The fragility of such economies and the communities that depend upon them illustrates both the direct and indirect effects of global restructuring on rural areas.

In this context, its worth noting that the arguments in the ECs Employment White Paper have been further developed by Mr Paleokrassis (who was until the end of 1994 European Commissioner for the Environment) into a set of proposals about policy shifts to encourage more economically, socially, and environmentally sustainable

[6] Agenda 21 of the 1992 Rio Summit.

forms of development in our cities and rural areas (Paleokrassis, 1994; European Commission, 1994). Part of the argument here relies on the so-called 'double dividend' (improved quality of life, increased employment) arising from the shift in taxation from work and enterprise to taxation on pollution and polluters. This depends very much on a reduction of private transport use, congestion and commuting and an increase in various forms of teleworking, telecommuting and distance working.

One of the more positive events in the years 1986 to 1995 has been the growth and impact of I&CT. The group felt that I&CT had grown exponentially in both volume and diversity but that the technical capabilities had often far outgrown applications in the period. The main constraints on greater diffusion of information technology in rural areas were mainly financial and practical - the cost of extending optical fibre links in remote and low population density areas, and the cost of initial dial-up calls, for example - and the resistance to adoption by potential rural users. A major issue was the uneven access to the information highway in remote rural areas, which reflects the natural tendency of the market to gravitate first to urban areas of high demand, as well as educational, training, budgetary, policy, and infrastructure problems. Nevertheless, many participants felt that rural areas had often been at the forefront of exploring new applications of Information and Communications Technologies (I&CT), where the benefits arising from 'distance-shrinking' were most apparent and could give rise to considerable savings for enterprises, individuals, and the public sector. In addition, the growth of teleworking was a feature of the period and the increase in home businesses using I&CT was important in some 'high-amenity' rural areas. Although the adoption of I&CT also meant that some jobs in banking, telecommunications, and other industries had been lost because of labour saving and in some cases centralizing effects of restructuring associated with I&CT, other jobs had been created by private enterprise due to the distance-reducing effects. At present, too few studies were available to assess the net effects on employment in different types of rural area, with different penetration of I&CT, but

evidence was emerging in a few cases of net employment gains which could be associated with improvements in the digital telecommunications infrastructure and the development of associated services.

Although these images of restructuring in the 1986-1995 period are by no means complete, participants felt that they gave a general impression of the rapidity and nature of the changes occurring. From this collage of impressions we can examine more closely some of the conditions in rural society and the potential problems and prospects for the future given what we have learned so far about I&CT in relation to rural development and to rural community development in particular.

Rural community and civil society

The seminar participants identified a number of characteristic features in the changing conditions of rural societies in industrial nations during the 1986-1995 period. Despite the apparent stability of rural life and the longevity of rural institutions in maintaining civil society, some key changes were noted since the first seminar in 1986.

Rural society is in transition. There is increasing evidence that the effects of global restructuring are showing up in a number of ways, although the impact of these effects are not even over rural space (Marsden et al, 1993). Some areas with direct links to the international economy are often affected by plant relocations and consequent rapid changes in the local labour market, others remain buoyant as they are able to offer comparative advantages to the global system. Those communities that remain outside the mainstream for reasons of self reliance or local marketing are often vulnerable to the withdrawal of government services as policies and programmes are cut back in the wake of fiscal constraint and social reform. Closure of a school or hospital may have the same debilitating effects on the community as the closure of a plant. All such effects have restructuring implications on the rural labour market where full time jobs, especially for men, are harder

to find, and part-time jobs - mostly occupied by women - are becoming more plentiful.

Although agriculture remains important in terms of employment and output in many rural areas, it is less dominant than it was. Some rural areas have diversified into services such as tourism and recreation and manufacturing. The traditional rural policy focus on agriculture is shifting, if slowly, to a more cross-sectoral and spatial focus on the broader rural economy and society. Among other things this involves a refocusing on the changing relationships between farming families, agriculture and land use in rural economy and society. This not only includes the changes in sourcing of farming inputs and in marketing and processing of agricultural commodities, but also the new demands on land and farmers with respect to the consumption of rural space for such things as recreation, environment and housing, as well as the non-farming work and income of farm family members. Although such inter-relationships between local and urban economies of rural regions have long existed, their significance in terms of policy or research has been underestimated. Over the 1986-1995 period, a number of attempts have been made to integrate the two together. For example, the European Commission's influential report on The Future of Rural Society considers the reform of the Common Agriculture Policy (CAP) in the light of the growing importance of rural development (European Commission, 1988). The Arkleton Trust Research project on Rural Change in Europe, 1986-1992, dealt among other things with the changes in farm family labour and income earning activities in both farming and local labour markets (Bryden et al, 1994). The European Commission's LEADER programme started in 1991 attempts to encourage integrated rural development on the basis of local partnerships.

Rural communities have also become important in themselves. During the period under review, the concept of 'community' was 'rediscovered' and has increasingly been adopted by government agencies and development specialists as an appropriate approach to local

development. Rural communities are recognised as important in themselves and are not just seen as support structures for primary production. The notion of community is a 'feel-good' concept and comes to symbolize, in part, the reaction of people to the alienating feelings of 'bigness' and 'homogenisation' of culture associated with globalisation.

Community development approaches became popular. Models of community development that emphasise horizontal and integrated management at the community level become more visible during this period. The successes noted by Dillman in his study of community development in the North West United States (Dillman, 1994), and in some cases the LEADER programme in Europe, was noted in this regard. Partnerships with government agencies and networking among communities and institutions become increasingly common and reflect new arrangements for the management of rural community development.

Demographic trends and the "rural renaissance."

During this period it was observed that a renewed trend of population 'turnaround' was underway in many countries and that a variety of rural places were being renewed with the ideas, wealth and energy of newcomers, including returners from earlier phases of out-migration. This contrasted with earlier periods in which most rural areas faced constant population losses and concomitant economic and social decline. The renewed mix of people in rural communities adds diversity and balance to many rural systems although some friction arises between newcomers and long-time residents or 'locals', often with a focus on housing costs and political differences concerning new development (Newby, 1979: Marsden, 1993: Shucksmith et al, 1994). In other cases, however, much of the population growth is associated with commuting to urban areas for work, a practice which may well be unsustainable in the long term.

In general, this period is one of fundamental change in the rural economies of many if not most rural areas. The 'new rural economy', as it is often referred to, reflects the shift in labour market conditions to a form of service economy in which greater female participation, insecure and short-term job tenures and the growth of small business enterprises are characteristic features. Niche markets are becoming more significant than mass markets and associated 'Fordist' production and employment patterns. Greater personal mobility is however another feature and in some areas close to urban centres commuting is common among rural residents, both old and new. There is greater diversity, flexibility and plurality in contemporary rural economies and social systems. This means new forms of prosperity, but also new forms of exclusion. For example, poor people, especially those without cars, telephones or computer skills are easily excluded from the labour force. The result is a more uneven landscape of well-being in rural areas, in both Europe and North America.

What lies ahead ?

When asked to contemplate the future of rural society in relation to IT, the seminar group identified a number of points of interest.

Most felt that, although the future course of events was fundamentally uncertain, the tendencies of the recent past would continue and even intensify over the coming decade. However, an additional factor was the changing age-structure of the population in many countries, leading to rapidly rising dependency ratios. One consequence was felt to be that previous arrangements for retirement and pension provision would no longer be 'sustainable'. Some felt that the Information Highway would increase the number of 'global players', competing away the windfall profits currently made by the few, however others felt that the few would move into sophisticated futures markets where only a few could play, and hence few could benefit.

The public sector

The pressures on public budgets would reduce public sector wages in comparison with others, and this coupled with general budgetary restraint could have serious effects on some rural areas which have become dependent on public sector employment and support. On the other hand, the public sector may well restructure its working practices to enable more teleworking, whilst devolution and decentralisation may also lead to a redistribution of public sector functions and work to regional and local levels.

Community

It was agreed that 'community' is likely to remain a central focus for future sustainability and development in rural areas. The quest for community would drive many of the future initiatives in development and it was seen as critical that rural communities themselves be able to take effective control of the process. It was in this context that IT was seen as particularly relevant. Assessing the needs and resources of communities and visioning the future with local people and community groups is a process that can be facilitated by IT in a variety of ways (survey of opinions, profiling the community from secondary sources, facilitating dialogue between community groups, enabling better flows of information, greater participation, and extending democracy etc.).

Personal development

The group concluded that I&CT would also be of increasing importance in terms of personal development. Based on early evidence from KITE and other observations on the 'liberalizing' effects of networking and telework, for some women in particular, the impact of IT in the future might be expected to be very positive. Personal development is an essential part of the training of teleworkers, whether employed or self-employed. The teleworking option can be economically liberating, although care is needed to address the social impact to ensure that the

result is not increased isolation rather than integration. Personal growth, more equal opportunities for women, individualization and reskilling are affecting human resource developments in ways that will assist the process of community development, if mobilized and used in a systematic and integrated way. This was thought to be particularly promising in regard to rural women and their participation in both old and new spheres of activity. The gender issue was not dealt with beyond this at the seminar though it constitutes a subject of considerable importance for the future.

Institutional development

Institutional development will likewise be served in the future by I&CT applications and the rise of a computer-literate class of rural residents. The need for institutions to be in touch, for information and communication, will increase dramatically, especially among the third-sector[7] institutions that will acquire more responsibility as the role of government in social services provision declines. Networking among institutions, instant communication with head offices, the capacity to keep records and to monitor activity for evaluations and adjustment are key management tools for the early twenty-first century and rural institutions will need I&CT more than ever. This will demand an integrated approach to the development of I&CT strategies at all levels.

Management

The management of physical communities in the twenty-first century will require all manner of I&CT applications and no less so in rural areas than anywhere else. Local government, however configured, will have to participate in the entrepreneurial and healthy communities debate and will need to understand and employ the nuances of I&CT in its work, whether collecting land taxes, facilitating community planning,

[7] Third sector organisations include voluntary, charitable, and similar organisations which are non-commercial and non-governmental in their orientation.

developing new employment practices or studying waste management options. It is here that the old leadership styles of the past may become a hindrance to community development, as in 'going it alone' or adopting an 'if it was good enough for me then...' attitude. As much as anything else in the restructuring debate, the need to adopt I&CT at the local municipality level will be one of the great forces/drives of rural change. For example, to facilitate inter-community collaboration, applications of I&CT will become essential. Horizontal interactions require different leaders and managers than those used in vertical structures and hierarchical organisations.

Role of the State

The group was very conscious of the changing role of the State in regard to IT and community development in rural and remote areas. It was felt that the emerging role of the state is to facilitate and foster development rather than to try to promote and control it. Partnerships have already become one of the main ways to manage a changing relationship between communities and their representative groups and the state agents of change. The decentralizing forces of contemporary restructuring suggest that a far stronger measure of disengagement is coming and that nation states will give way to regional and local authorities, and new forms of partnership, in many of the activities that affect the lives of ordinary citizens. Information Technology will allow communities and regions to be more autonomous without losing touch with the central state and related international matters. It was felt that I&CT would facilitate a greater degree of autonomy in the future rather than militate against it. Much will depend, it seems, on who controls the infrastructure through which most of the I&CT will function.

Education has an important role to play in the connections to community, and the state's position on this aspect will be important. Although the state cannot assist in devising local character and distinctiveness, it has the task of accepting what local groups and committees see and seek for themselves. However, facilitating and

listening to the organised and considered voice of the people is not a role that the current state agencies are particularly used to, or even comfortable with, and a learning process will be involved for all concerned.

Access

The main problem in the future will remain the issue of access: access to infrastructure at reasonable cost in remote rural areas (a policy issue) and access by individuals to the networks, machines, information, and know-how of I&CT. Clearly a successful telecottage in an area will encourage access for those unlikely to get it otherwise and even if only utilized for a generation - that is, until most residents/households have a computer terminal - telecottages will have served a useful public purpose. This position, of course, assumes the outlook that I&CT is a public good and that while the means may be privately provided, the right to access and the reasonable chance of benefiting from it is a public good. It will certainly be a central issue if it can be demonstrated that community I&CT is positively associated with sustainability. Adopting a position that I&CT is only a means to increase private wealth will certainly hinder rural areas from gaining any real benefits from IT. Although rural areas will become increasingly differentiated by their niche products and individual identities, I&CT is essential to all of them and is one means of keeping a semblance of a level playing field. I&CT, it was felt, is a public good and should be developed as such, using private means wherever possible, but not leaving it for the private sector to develop alone.

Despite these fears and problems, and the obvious constraints, participants came back time and again to the simple and obvious point that I&CT has the power to completely transform the economic prospects and living conditions of rural areas in all the various ways mentioned in earlier sections. This is because physical distance for many purposes ceases to be a major issue, and because the information content of work and enterprise is becoming so dominant. Accepting this

general point, the key questions are about how the state, community, technology bodies, entrepreneurs and rural people can act to secure these potential gains and avoid winding up on the 'losing side' of the process. Access and costs of access to the Information Highway are obvious problems to solve, but they are not sufficient to secure these potential gains. This is because it is individual and social action which in the end determines how technologies are adopted and used.

How do we get there ?

There was general agreement that diversified rural communities would be strong ones in the future and more able to sustain themselves in a period of continuous change. It was also felt that I&CT would contribute to the process of diversifying the local economy and employment. Such was the importance of these changes that planning to include I&CT in the future of rural communities should begin now. However, it was also recognised that a diversified mix of community activities would require competent and integrated management to facilitate a continuous connection to the centre and it's information sources, while at the same time achieving a degree of autonomy and self-determination. Networking with I&CT would achieve both. Education would take care of individual skills in I&CT, while the state would be expected to assist with some community development aspects. Cooperation in the future will be more important than competition, at the community level.

In supporting community use of I&CT, a number of 'best practices' were recommended by the seminar group. These practices, outlined below, will help communities to increase their capacity for I&CT-assisted community development.

* encourage 'champions' to emerge who will become the I&CT leaders in the community, and help engage small enterprises, community and voluntary organisations, local authorities and agencies, educationists and the general

public in the development of I&CT strategies and actions. This could be done by providing I&CT-skilled helpers to assist newcomers to gain entry into the world of telematics;

* ensure that intermediaries are gate-openers rather than gate-keepers, and have the community's I&CT interests at heart;

* recognise that good community development takes time;

* consider public libraries as potential centres of I&CT information in countries where they are present in most rural areas. Libraries can be points of access to the world of information, and provide the kind of support that helps people take advantage of it;

* always emphasise the autonomous aspects of the process - consider IT as a community empowerment tool;

* encourage communities to collaborate rather than compete. For example, to achieve the economies of scale in I&CT and community development, it may be advantageous to cooperate with other communities in the area.

These ideas emerged from the community development experts at the seminar and reflect a growing amount of experience with what works well in community capacity building. In practice, however, they must be tempered by mechanisms designed to protect the interests of the disadvantaged members of communities. Elitism was mentioned repeatedly as the main problem with I&CT at the local level. In this regard, it was suggested that intervention by exogenous agents was not a bad way to initiate the process, but that local control should be exercised wherever and whenever possible.

The charge to the research community that flows from this line of thinking is that 'best practice' needs analysing and reducing to basic

steps for communities to initiate their own process. Such work would also inform development agencies and those promoting IT in whatever form.

Beyond that, there are of course the basic issues of access to be faced. Many advanced uses of the Information Highway demand high speed and high quality communications links, dependent either on optical fibre links to the end user, satellite communications, line of sight laser beams, or microwave radio. Given that the backbone of the Information Highway is increasingly optical fibre, that satellite communications seem likely to remain relatively costly for the user, and that line of sight is often severely constrained in rural areas, in most cases it seems attention has to focus on optical fibre. Alternatives may emerge however as the technology of mobile digital telephony and the use of low earth orbit (LEO) satellites improves and costs fall. However, in the less densely populated rural areas, and those not close to the 'backbone', in particular, the costs of connection and use can be high. The key to mass connection in rural areas is likely to depend heavily on the ability of telecommunications companies to offer entertainment and infotainment down the optical fibre into the home, rather than largely, or only, on the business generated by small firms in rural areas. It follows that rural areas have a strong interest in arguing for deregulation to permit telecoms companies to carry entertainment and infotainment. This is currently not permitted in many countries, including the UK.

The notion of Universal Service

A key issue here is what constitutes a 'universal service' in the world of modern communications. The concept of a universal service is still strongly dominated by voice telephony; in the present and future, the focus has to shift to the level of digital communications which should be available to all. Whilst it would be possible now or very soon to provide high speed high quality digital communications to 'nodes' of high volume users (large businesses, colleges, local government headquarters

etc) in rural areas, this situation is far from ideal, particularly if certain types of information or service can only function effectively through such communications. Current examples would include graphical images on the World Wide Web, high quality CAD-CAM images, digital music, and quality video conferencing.

In addition, rural areas have a strong interest in the way in which telecommunication tariffs are derived. They have suffered in relative and absolute terms from distance-related tariffs which are in any case less relevant given the new mix of technologies involved. The logic of distance-related tariffs is becoming increasingly open to challenge, given the nature of new communications technologies.

Given the evidence that awareness of the techniques, opportunities, and threats associated with the Information Highway was usually low, especially in rural areas, there was a strong view amongst participants that local communities needed to be encouraged to develop their own I&CT strategies. This issue is taken up again later.

IV. Education and Learning

Given the changing nature of work and the ending of an era where people could expect to remain in the same job for life, there is a new emphasis on equipping people with learning skills rather than with particular task-related skills from the primary level on. This is combined with a new emphasis on lifetime learning, which can enable people to adapt to rapidly changing forms of work. These changes mean that education and learning must be more widely 'accessible', in both the physical and social senses of that term. Given scarce resources, they also imply that the technical efficiency with which education, training and other learning skills are attained must be radically increased. Educational and learning technology, and the modes of delivery are thus key foci of concern, especially in rural areas which generally lack access to traditional forms of higher and lifetime learning, and which have sometimes faced severe problems in delivering high quality secondary education due to small school sizes and remoteness.

What has happened in the past decade.

Many of the same tendencies discussed above under 'work and livelihood' apply to education and learning. However, there has been increasing concern about levels of illiteracy in some rural areas, and the effects of that on chances of remunerative, or even any, employment in the new labour market conditions.

There has been a great deal of experimentation in the past decade. By the mid-1980's, in the UK, there was a BBC microcomputer in almost every school[8]. In remote areas, like the Orkney Isles, whiteboards (electronic blackboards connected by high speed communication links and allowing secondary school pupils and teachers in different locations to share the same board simultaneously) were introduced. These were also used for higher education - delivering adult education to remote islands. Ironically, whilst those islands with secondary schools received a distinct advantage from this, those with only primary schools faced an

[8] The BBC Microcomputer was developed specifically for schools in the UK and used a simple form of the Basic programming language (BBC Basic).

increasing relative disadvantage as conventional forms of adult education delivery declined. In the Western Isles of Scotland, Bruetel, started in the early 1980s, linked all schools in the Islands and enabled teacher support even in the smallest schools (Matheson, Bryden and Fuller, 1986).

By the late 1980's, the Open University and other Higher Education institutions were beginning to support remote students with telephone and computer conferencing. In the second half of the 1980's, a small group of remote part-time students in the Highlands and Islands of Scotland participated in a course in Computer Mediated Communications offered by the University of Guelph in Canada, using the computer conferencing system, CoSy. In the early 1990s, Lews Castle College in Stornoway was using RURTEL (the local service applying CoSy in the Highlands and Islands, and initiated by The Arkleton Trust) to support remote students throughout the region. By the mid-1990s, use of interactive television and satellite broadcasting was becoming more common (for example, in Finland).

A frequent comment, however, was that in many schools the equipment languished because teachers were not trained to use it, and may even have been afraid of it. In addition, experiments were fragmented and isolated, rather than forming part of a cohesive strategy. Moreover, they tended to focus on individual students, and applications involving training for small enterprises were rare.

A further comment concerned the growing differences between schools which were and were not able to make effective use of new technologies.

Computer based learning systems are expensive to develop, imposing problems of uniformity, and associated difficulties in adapting learning programs to local conditions and differences between pupils. Thus examples used by standard programs may not be appropriate to the prior experience of pupils, or local conditions and contexts. Whilst often

highly effective, they required further development to permit adaptation, and adaptations in the role of teachers. These adaptations did not occur automatically, although they may be much more consistent with the basic skills with which teachers are in fact equipped. Machines would not replace teachers (although teachers often feared this outcome), but would restore their role as supporters of learning processes, and free them from much of the routine of teaching large classes.

The next decade.

A strong comment on the future was that the gap between what is possible and what is likely to be done in practice may widen even further.

Moreover, the transfer of responsibilities for educational management to local and even school level is likely to lead to increasing fragmentation.

Although there was a strong expectation that the next decade would see a computer terminal on every pupil's desk in the UK, the US and some other countries, the utilisation of the possibilities opened up would inevitably vary widely.

This could lead to a polarisation in educational quality and provision, although it would be wrong to assume that this polarisation would necessarily occur along traditional lines. There was some evidence that schools in traditionally deprived areas, and serving disadvantaged sections of the community, were sometimes making more use, and more imaginative use, of I&CT as an educational tool, than other schools. This experience needs to be documented and evaluated.

IT Strategies

There was considerable discussion on the need for appropriate I&CT strategies for schools, colleges, and other educational centres; these will not have exactly the same requirements as for individual and/or

commercial users. It was overwhelmingly agreed that simply installing hardware and/or software which would allow students and staff to communicate is NOT enough. There are three main problem areas to address:-

1) Staff training for using communications technologies. This ranges from the very elementary introductions on 'what is e-mail' etc. to sophisticated I&CT authoring packages which would allow staff to create their own educational resources (e.g. WWW pages, interactive software, etc.)

2) Appropriate hardware/software should be adopted throughout the institution. The lack of clearly articulated I&CT strategy and aims has frequently resulted in the purchase of a very wide variety of terminals, systems, and software. Some of these are incompatible, leading to widespread confusion and lack of internal communications. Often, I&CT has been led by computer specialists with ideas, needs and priorities which differ from those of users. Users have been insufficiently integrated into the process. In many cases this lack of appropriate systems has led to new I&CT centres acquiring computers, peripherals, and software which are often far in excess of their needs (both in terms of financial costs and in technical sophistication). In some cases this might not seem to be a major problem, as the centre can expand through time to make full use of its resources, but often the sheer weight of technology is oppressive to new users, who feel intimidated and inept because they apparently know so little of such a complex issue. If the technological overkill outweighs the desire to communicate with new technology there is a risk of the new user becoming discouraged by and disengaged from the learning process. While maintaining a plethora of I&CT possibilities offers distinct advantages to users (and institutions), this should be within a planned strategy of network compatibility.

3) Educational criteria are quite distinct from the priorities of general communications, marketing, and commercial usage. This is not simply an epistemological issue, though this is a major consideration, but also a question of who gets access, who decides what is legitimate knowledge, who pays operational costs of gaining access etc.? The issue of rural illiteracy might also be a major issue, and in this case a barrier to IT use is posed before the terminal is even switched on.

In particular, there was discussion on the degree of suitability of the direct use of the Internet for tuition (as opposed to sharing knowledge). Some participants felt that Local Area Networks (LAN) might be a more appropriate introduction for new students wishing to use IT. However, important advances have been made in interactive systems for student support. Examples include user-friendly systems of 'point-and-click' front-end controls, such as the FirstClass system used by the University of the Highlands and Islands (UHI) colleges and the Open University (OU) in the UK, and also the dedicated teaching role of the T-CoSy system on the campus of the University of Guelph as well as at other universities in North America.

There is therefore a pressing requirement for educationists wanting to use I&CT to clarify more precisely what they want to do, and for these tasks to be matched to appropriate resources.

The Key Issues

Issues which emerged from this discussion included:-

1) Appropriateness. There was a strong feeling that users (especially new users) of I&CT should be comfortable with the equipment and system(s) which they need to use. Not everyone needs, or wishes, to communicate globally, and for these people it may be more important to use a more limited system which allows them to communicate with a particular group of people whom they wish to speak to (e.g. internal e-mail, list-servers, closed conference). It should be very much a matter of 'horses for courses' and the analogy was made 'why buy a Rolls Royce

when I just want to cycle five minutes down the street?'. It was accepted that the provision of appropriate 'gateways' to link with other networks should be in place to satisfy the growing needs as users become more confident and ambitious. However, although some people will want to use e-mail relatively locally, there should therefore be no compulsion to 'mainline' directly through the Internet, neither should they be deprived of the potential benefits of access to a broad range of educational resources which the Internet provides (for example from 'SchoolNet'). In this context there is also a need to encourage students and staff to communicate both within and between rural schools. In the context of staff training there is a desperate need to establish professional standards, training schemes for trainers, and a greater staff awareness of the educational potential of I&CT at different levels within their own specialist subjects. The crucial point here is that I&CT, and the use of computers, provides new tools for communication and access to information and knowledge, and needs to be taught as such.

2) Security. There was a feeling that information which is put onto the Internet is both readily accessible, but also open to misuse. As well as the implications of copyright and commercial gain, there are additional concerns in the areas of access to confidential information on students and/or between students and tutors. There are also pedagogical concerns relating to the assessment of knowledge, and how this can be directly attributed to the correct student at a distance. While there are ways currently being developed to enable students to be examined at a distance (e.g. video conferencing, closed-circuit television systems, networking of distance-learning centres for examination etc.), these considerations need to be built into the teaching model from the outset, not simply tacked-on as the problems become relevant. There is an inevitable trend for the teacher to become more of a facilitator, directing students to appropriate informational sources, rather than for the teacher to be engaged in providing all the answers.

3) Copyright & commercial gain. It was accepted that there are different levels of information which could be placed on the Internet, for example

basic information on educational courses available, course and staff descriptions, handling of marketing and queries etc. could be freely accessible, but actual teaching material would require access via the purchase of a password. Even this, however, is not ideal, and is open to misuse in a society in which access to education and the provision of educational opportunities have both become highly competitive commercial activities. It is necessary to consider which elements of the information and knowledge system should be treated as 'public goods'. The desirability of exploiting resources such as WWW marketing and general information was widely acknowledged, but it was felt that this should be seen as distinct from the teaching component, which requires a great deal more attention to details of confidentiality, support services for learners, and measures to insure that any barriers of familiarity with technology do not prevent students from developing their own learning potential to the full in their chosen subjects.

Allied to this, there is an issue as to how rural people can best participate in the creation of knowledge systems, and resources, and how educational courses can be tailored to include locally relevant materials.

4) Information overload. A very real concern is that the enormous volume of information (and data) which is currently available electronically can tend to swamp even experienced and enthusiastic users. A filter system may be needed to ensure that students are not overwhelmed with choice and become 'lost' in the system.

A potential problem resulting from such a wide availability of detailed knowledge and of the flexibility of access lies in maintaining the intellectual integrity of educational opportunities. The apparently limitless 'pick-and-mix' choice of modular courses requires somehow to be regulated through the clustering of modules within a disciplinary, or indeed inter-disciplinary, framework which ensures that the path of knowledge is both progressive and complementary, rather than fragmentary and direction-less.

Action

The challenge of how to incorporate the features of locality and local educational priorities into computer-based learning packages which were expensive to develop and hence aimed at large scale markets remains a priority for the next decade. Rural areas and people have a strong interest in this, because of their enormous diversity and cultural particularisms, but also because of the high costs of delivery of conventional education.

New educational technologies using I&CT and (sometimes) telecommunications offer tremendous possibilities for improving individual and group learning skills which will be vital to take advantage of new opportunities in future in both rural and urban areas, and for improving access to these skills and opportunities in rural and remote areas and for individuals and groups normally 'excluded'. However, a key element will be professional development of teachers which changes in educational management may make more difficult or at least uneven. Tackling this latter problem requires the raising of public awareness.

One way of improving awareness will be through the stimulation and support of the development of local I&CT strategies. The integration of educational dimensions of IT & telecommunications may well be made easier in future because of changes in the management of education at all levels, but it is unlikely to happen without some form of support and encouragement.

V. Rural Community and Civil Society

There was wide agreement that I&CT had major implications for communities and civil society in general. For the first time in history, the information highway is creating major opportunities for the establishment of social relations between people who have never physically met together, and these 'cybersocieties' are creating rules and norms, and associated sanctions, beyond the bounds of local or even national society. Although this happened to a limited extent with the expansion of letter writing and postal services in the 19th Century, and also with the development of voice telephony, the widespread scale of exchanges opened up by I&CT is new.

Moreover, the recent past had seen an increasing focus on 'community' as an appropriate locus of action, partly due to 'offloading' of responsibilities from central Government in areas like health and social welfare, education, training and in certain areas, economic development. However, this tendency can also be seen in a more positive light as a response to demand for greater participation, or as a recognition that some kinds of decision and some kinds of activity are best undertaken at the most local level of action, namely 'community' or 'locality'.

Another dimension of this focus on community concerns the view that urban-rural movement of people is at least partly motivated by the 'search for community', with 'community' being something people associate with 'rural' places.

What it has meant in practice is a greater emphasis on local problem-solving, and on group or partnership working. It has also meant greater use of volunteers, in some cases leading to exhaustion of voluntary capacity in rural communities, and with risks in terms of the social balance of representation.

What is going to happen?

The view was that the 'downloading' of responsibilities to local communities was a trend which would continue and even intensify in

the years to come. 'Nobody else is going to do it for us' is an increasingly voiced view at local levels.

The fear was expressed that this might lead to increasing polarisation between rural communities on the one hand, and a reinforcement of polarisation within rural communities on the other. Increased polarisation between rural communities could arise from the withdrawal of the central Government from systems of social and spatial redistribution, and the fact that stronger communities (in terms of their capacity to act, and human and other resources) would stand to gain most. Increased polarisation within rural communities, which in the discussion on employment and livelihood was felt to arise from global market forces as well as reduced social welfare support, could be reinforced by biases in representation and participation in community-level institutions.

On the other hand, any community's ability to act would be partly determined by how effective it was in creating, maintaining and addressing shared goals and interests and building trust across social and micro-spatial boundaries (e.g. across both 'sides of the track'). The emphasis here is on collaboration, group working, and social process.

What can be done?

The information, which all people and communities need to help them act effectively, needs to be accessible in all communities and in divers places, and not only in central places or places which can only be effectively accessed by the few. Since the I&CT revolution readily provides the means to achieve this, public authorities must both ensure that the regulatory framework and public initiatives encourage this, rather than creating artificial barriers to access, and take a lead in relation to public information itself. In other words, they must use IT&T to ensure open access to information which is in the public domain, and improve access to decision makers as well as public participation across the board.

Ultimately the 'information highway' will reach into each and every home. In the interim it will reach a few homes, and homes in rural areas will be disadvantaged in terms of cost, speed and quality of access. The common view is that this situation requires, in the medium term, 'nodes' of access which can provide the bulking of demand within communities. These nodes might be in schools, libraries, post offices, village halls, telecottages etc. The important point was to ensure that the location and operation of these nodes did not 'exclude' particular social groups by reason of cost, comfort-levels, opening times, lack of transportation etc.

Associated with these 'nodes' should be people variously described as 'brokers', 'champions', 'promoters', 'animators' whose task would be to encourage and stimulate local engagement and participation from all groups, and to ensure that technical systems were not a barrier.

VI. Conclusions

In developing public policy, strategies and action in relation to development and education in the Information Age, it will not be sufficient to 'back winners', and ignore areas and people who are displaced or disadvantaged by the social economic and political processes involved in the changes going along with rapid adoption of Information and Communications Technology. It is ever more necessary to pay explicit attention to those people and spaces likely to be 'left behind' by the developments led by the market and regulation. In this context, 'winners' or 'losers' can refer to people, individual firms, sectors, or spatial areas (including rural areas). The evidence to date is that many of the winners from the I&CT revolution are in sectors under-represented in rural areas, amongst people clustered in or around urban areas and with certain high level skills, and to date policies seem to be weighted in favour of the latter.

Whatever the eventual choices, and these are not likely to be the same across countries, rural people and those institutions serving them are likely to have a strong interest in ensuring that they are not unfairly disadvantaged by unequal access to the economic and social infrastructure which is necessary to participate in the information economy. A key access issue for all those likely to be most disadvantaged, wherever they may be, concerns the question of what should be regarded as a 'public good' in relation to the Information Highway.

Several key issues concerning this access were highlighted during the seminar. These referred largely to the domains of employment and enterprise, education and learning, and rural community and civil society. Across these domains, common elements of a new approach to ***rural*** I&CT strategies referred to the need for collaboration and participation at local levels, the need to ensure access, the need to provide support both for infrastructural development and I&CT 'champions' at local levels, the need for a new definition of 'universal service' in relation to telecommunications and new charging systems, the need to ensure that new regulatory practices and policies recognise the

particular needs of rural and remote areas. This will raise awkward issues between regulatory systems for broadcasting and telecommunications, and between urban based cable companies and rural interests, both of which have to be faced squarely.

In a number of the aspects of I&CT discussed, the issue of what elements constitute public goods, which should be freely available, is crucial. It is worth recalling that the Internet itself can be considered largely as a public good, without which much of the commercial and non-commercial activity which it has generated would not have developed. Thought needs to be given to those elements which should be treated in this way if the impact of I&CT on economic and social development is to prove positive, especially when dealing with regulatory, educational and development aspects of the information highway.

The expansion of roads, railways and shipping in the 19th Century provided both new problems and new opportunities for people and facilitated an enormous expansion of trade and commerce. Equally, it often had serious consequences for rural and remote areas for example through exposure to new competition, and through massive emigration and centralisation. As we approach the twenty-first century the introduction of new information and communications technologies is beginning to give rise to new kinds of opportunity and new consequences for rural people and places. Unlike the earlier revolution in transportation technology, it offers the hope and prospect of decentralisation of economic and administrative functions, and for new choices about location and lifestyle. All the signs are that these consequences will affect all the various aspects of life in major ways. Whilst we may divide the world into missionaries of the new technology on the one hand, and sceptics on the other, there can be little doubt that a new revolution is in progress in which IC&T is playing an important part. Rural people, organisations, educationists, practitioners, governments, and researchers surely need to be aware of it, and to engage with it, if the social benefits are to be maximised, and the costs minimised.

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Annexe 1: What is the 'Internet'

The Internet is a paradigm for the Information Highway. It is a virtual global network of computers linked by high speed communications 'lines' and using a common 'protocol' for talking to each other. It is not controlled or organised by any agency - only the protocol governs exchanges - which also makes it a paradigm for new decentralised and horizontal forms of organisation. The content of 'talk' between computers can be speech, text, numbers, pictures and images, music - anything which can be converted to 'digital' signals. Probably the most common uses up to now have been related to text and numerical data, but increasingly other forms of communication are using the Internet.

Any individual can in theory access the Internet, provided they have a simple terminal device (commonly a computer), a modem (to convert messages into digital form) or direct access to a Local Area Network (LAN) connected to the Internet, a communications program on their computer (to act as the interface between the user, the modem, and the Internet), and a password on an Internet host computer or a LAN connection. Until recently most host computers were in Universities and Research establishments, but there has been an explosion of hosts run by communities for public access, and by commercial operators. Similarly, uses have diversified from predominately military and academic into commercial, public and community use.

Annexe 2: Case Studies

1. Community Access to the Superhighway in the USA

Source: PRESS RELEASE: NPTN Rural Information Network (tmg@nptn.org) 12/10/94

NATIONAL PUBLIC TELECOMPUTING NETWORK WINS FEDERAL GRANT TO SPUR DEVELOPMENT OF RURAL COMMUNITY NETWORKS

Construction will soon begin on rural America's ramps to the Information Superhighway, via a federal grant announced today that will put nearly $900,000 toward the effort. Twenty electronic community networks in rural areas are planned, each offering citizens free or low-cost access to electronic mail, a broad range of professionally produced information services, and the Internet.

The grant comes from the National Telecommunications and Information Infrastructure Assistance Program, under the auspices of the National Telecommunications and Information Administration (NTIA), U.S. Department of Commerce. It was made to the National Public Telecomputing Network (NPTN), a pioneer in building electronic community networks throughout the U.S. and overseas.

"America's progress toward an equitable Information Age will be measured by the number of local electronic systems we can build, using local resources to meet local needs," says Tom Grundner, Ed.D, who is the founder and president of NPTN. "The 'Information Superhighway' only makes sense if there's a parallel development of these kinds of local networks. Through this grant, the NTIA is taking a major step toward realizing this goal."

Grundner points out that NPTN's grant will spur the development of additional community networks in rural areas and will provide for extensive development of prepackaged services in the areas of K-12 education, teledemocracy, health and wellness and agricultural information. "This will go a long way toward separating the rural-urban issue from debates about the 'information haves' and 'have-nots,'" he says.

Following its traditional model, NPTN will work with members of the local rural communities to establish their electronic networks. Its counsel will cover the system design, which includes an easy-to-use graphical user interface via FirstClass software from SoftArc, Inc., and an information architecture that reflects local information needs like city government proceedings, politics, community happenings, and health care.

The selection process for rural communities that will participate in the grant's project is expected to begin in January, 1995. Before then, a call for applications will be made to governments, libraries, schools, and other rural institutions.

NPTN will also provide the rural networks with what it calls "cybercasting" services. These information services and programming are distributed on an affiliate model similar to the way radio and television programs are distributed.

NPTN features include online access to a selection of more than 40 newspapers, such as the Washington Post, the L.A. Times, the London Daily Telegraph, and USA Today; Academy One, 65 online educational services for teachers, students, and administrators; and the Teledemocracy Project, a suite of government information services designed to raise participation in government decision-making. Among other services is the Electronic Smithsonian, a "virtual tour" of more than 140 of the museum's most popular exhibits - with photographic images and text that are placed on the rural network for access by network members.

"We provide the kind of value-added information services and programming that community networks cannot afford to develop on their own," says Grundner. "These kinds of commercial-quality services help attract community network members. This, in turn, sustains the local spirit of the network, because there's that much more community participation."

As an example, the Cleveland Free-Net, which Grundner founded back in 1985 while at Case Western Reserve University, has more than 100,000 members with over 128 special interest groups covering a range of local issues. It's active, too, with more than 14,000 logons per day.

In fact, NPTN has already helped 42 communities across the U.S. and in 10 countries overseas build their "Free-Net" community networks, with citizen organizing committees active in 121 other communities.

For more information about the NPTN, contact its headquarters at 216/247-5800 or via e-mail at info@nptn.org.

2. The (Virtual) University of the Highlands and Islands

The UHI (University of the Highlands and Islands) is a development project currently attempting to form a new university by linking together local colleges of further education and other research institutions throughout the region to form a federation capable of delivering higher education and research products. There is at present no university based within the Highlands and Islands of Scotland, and the continued loss of young people to established universities in other parts of Scotland and the UK is a priority cause of concern in stemming rural depopulation and loss of vitality in rural development initiatives. Individual colleges in the UHI network, however, have a good reputation in working with local communities and delivering local training.

These colleges are now linked by a formal agreement to work towards the creation of a university, and as part of this process several degree courses are being developed for delivery in the immediate future. It is of particular note that a BSc in Rural Development, and a BSc in Environment and Heritage are keystones of the new academic syllabus, linking the development needs of the region with a recognition of its strongest natural assets.

IT developments have been moving very rapidly within the UHI Project over the past 12 months. Prior to September 1994 none of the college partners had Internet connectivity nor

were they using electronic communications to any great extent. In mid 1994 two pilot projects were initiated, one equipping five colleges with the FirstClass mail and text conferencing system and another providing Internet connectivity to two colleges. The colleges who received FirstClass have been using it extensively for internal communications and collaboration via intermittent modem connections, whilst those who received Internet connectivity have made considerable progress in developing and using Internet services, including the establishment of World Wide Web server sites.

The UHI network currently has a structure of 12 partner institutions scattered across the Highlands and Islands, one of the most sparsely populated areas in Europe. These partners are now physically connected to the UHI hub in Inverness via BT leased line (64kbps) and Cisco router technology. The hub provides routing for college communications and also supports a direct connection to JANET through an SMTP gateway. Technically the sites manage their own LANs and are responsible, in collaboration with the UHI hub, for ensuring that they can communicate effectively with the UHI network and the Internet. In addition, all sites maintain their own FirstClass servers for e-mail and text conferencing.

The colleges have indicated that it is the intention of the UHI eventually to be able to deliver all courses both in face-to-face and distance learning format at the earliest possible date. To this end the UHI partner institutions have taken a two pronged approach to meeting internal and external electronic communication requirements. The former have largely been met via the creation of a FirstClass UHI WAN that supports electronic mail and text conferencing, whilst the latter, has been achieved by providing full JANET connectivity to all partner institutions. The capital costs of realising this have been considerable, primarily because there is no local university capable of offering a direct JANET feed. Consequently, UHI has had to establish a JANET 'Point of Presence' in Inverness and carry the overhead of connecting this to Edinburgh. All UHI partner institutions currently have a full JANET connection and a FirstClass system, however, they are not all operational yet, and it is hoped that in the near future there will be a Point of Presence in Inverness for SuperJanet access. Several colleges are also developing World Wide Web server sites, and these are being investigated for marketing, teaching, and dissemination of research results.

The incremental development of an advanced electronic communications infrastructure is seen as pivotal to the future success and operational effectiveness of primary, secondary and tertiary education within the Highlands and Islands. Such an infrastructure will encourage partnerships and collaboration, enhance external communications, and allow education in rural communities to flourish. Indeed, this is already apparent as colleges are sharing experiences and expertise, universities are fostering closer working relationships with local institutions, school co-operatives are being established, and policy discussions are under way to integrate educational networks within the region. The enhancement of current levels of technical support and the instigation of a training procedure for all staff across the network is also seen as an immediate priority. Once these systems are up and running they will become an integral part of the UHI teaching, administrative and research infrastructure.

Some of the UHI partner institutions already have close working relationships with established universities e.g. Inverness College with Stirling University, and Lews Castle College and

Sabhal Mor Ostaig with Aberdeen University. These links are being built upon to provide a multiplicity of educational options and career routes for future UHI students, ensuring maximum credit flexibility together with home-based or very local delivery of courses. Several colleges are already working on the practicalities of extending the sphere of access beyond the confines of their own colleges, down to a level of community access through local telecottages, schools, libraries, and other sites of community or public access.

The UHI is also piloting two video conferencing projects using Satelcom UK Ltd Cameris systems running over ISDN-2. Initial responses suggest that for administrative purposes this technology is both useful and cost effective. The most prolific user has been the Highland College of Nursing and Midwifery where mobile video conferencing systems have become an integral part of both their teaching and administrative functions. Other cross-network development teams are also using video links to avoid the necessity of constant travel and time-away-from-home in a region where transport links are often time consuming.

3. Canadian SchoolNet/ Community Access Project

SchoolNet

The SchoolNet project began less than two years ago as a joint federal, provincial, territorial and private sector initiative. It was designed to provide Canadian students and teachers with exciting electronic services which would develop and stimulate skills needed in the new information age.

Today, over 4,500 of Canada's 16,500 schools are electronically connected, with over 700 diverse services available to SchoolNet users across the country.

Since October 1993, there have been over one million accesses to SchoolNet representing a monthly growth rate of 65 per cent.

As part of the SchoolNet Community Access Project, it is anticipated that all 16,500 Canadian schools and another 3,400 public libraries, including all universities and colleges, will be connected to the Information Highway by 1998.

SchoolNet will also connect all 417 aboriginal schools under federal jurisdiction.

The SchoolNet Community Access Project is an initiative designed to ensure that Canadians in rural communities have the same access as those in large urban centres, to opportunities offered by the Information Highway. The project focus is on the delivery of government services and information to, and on, assisting rural communities in developing the skills necessary to create and maintain jobs in the information driven economy.

The SchoolNet Community Access Project will provide up to 1,000 communities across Canada with access to the Information Highway through schools, libraries etc. Federal assistance of up to $30,000 per site will help cover equipment, connectivity and training

expenses, and provide technical support as well as locally useful electronic content such as business services.

Development of the Canadian Information Highway is an imperative if Canada is to compete successfully in a technology dominated global economy. The government is fully committed to developing and taking advantage of the opportunities presented by the Information Highway; the SchoolNet Community Access Project is an integral part of this process.

Community Access Project Objectives

There are four principal objectives.

1. To help provide training for local entrepreneurs, employees of local businesses, educators and others interested in improving their information management and networking skills;
2. to foster conversion of existing government and other services to electronic delivery as well as the development of new services, with a view to providing better and more economically efficient services to all Canadians, regardless of the size or location of their community;
3. to help raise awareness within Canada's rural communities, including aboriginal communities, of the benefits and opportunities of using information technologies and services;
4. to accelerate access to, and use of, the Information Highway by electronically linking Canada's learning system - schools, libraries, training centres, colleges and universities.

Opportunities and benefits communities can expect from the Community Access Project.

There is a broad range of opportunities. In a large measure, it will be up to the communities to see where and how these are best utilised. The primary opportunities and benefits are:

* Help in training local entrepreneurs, educators and others in new information management, networking and other important employability skills;
* government services and information more accessible through electronic means;
* finding and retrieving information on virtually every topic from everywhere in Canada or around the world;
* more efficient identification of business, job and promotional opportunities for individuals, business and communities;
* help local economic development and job creation through linking communities to the Information Highway;
* ensuring equal access to the new information technology skills for young people in rural communities;
* local entrepreneurs will be able to see themselves on the Internet by having a home page;
* ensuring that even small and rural communities can be part of the social, cultural and economic mainstream of this country.

Community Access Project Management

The SchoolNet National Advisory Board is already in place. It is chaired by a representative of the Council of Ministers of Education and includes members from all provinces, educational stakeholders and from the information technology and telecommunications industries. The Board is now being expanded to include various federal departments and service clubs to aid in the project implementation. The Board will play a major leadership and guidance role in the overall management of the initiative's directions and resources. The project is managed jointly by Industry Canada and Human Resources Development Canada. The federal government is advised on the project by the SchoolNet Advisory Committee and by CANARIE Inc. (Canadian Network for the Advancement of Research, Industry, and Education). CANARIE Inc. will also administer the annual competition. At the community level, there is a Community Access Project Management Committee which oversees the planning and the day-to-day operation. The local communities are assisted and advised by the Community Access Project Provincial Project Facilitators who are normally representatives (or officials) of the provincial government.

For further information see:-
SchoolNet WWW site: http//schoolnet2.carleton.ca
Community Access Program WWW site: http//cnet.unb.ca/cap/

4. Volkshochsschule Norden (VHS-N)/GAG Ltd, Lower Saxony, Germany.

During the last ten years VHS-N/GAG has trained thousands of people in handling and using information technology. Most were formerly unemployed, and are now teaching their own bosses how to work more efficiently by using computerized workflow. VHS-N/GAG itself employs over 100 people, many of them formerly unemployed graduates such as technicians, business-trainees or designers.

VHS-N/GAG is still involved in training and consulting, but has also developed a very successful database system of relevant and topical local and regional information. This system allows the totally automatic network integration of such services as available tourist accommodation (especially small Bed and Breakfast establishments), Sunday operating hours of doctors and chemists, etc. The system is wholly owned by GAG Ltd, and mainly operates in a number of towns and villages in East Frisia as an information-point system. GAG is considering whether to install its own Web-Server as a regional window to the WWW.

GAG is involved in many regional cooperation projects within Europe, including the Community Initiatives, LEADER and INTER-REG, and the Environmental programme LIFE. One of these involves a cross-border implementation of GIS (Geographic Information System) involving the northern Netherlands and four counties of North East Germany.

5. 'IT ACTION' in the Highlands and Islands of Scotland.

Traditional I&CT stimulation work in the Highlands and Islands has been delivered on a top down and technology driven basis. Unsurprisingly, this has led to a market relatively aware

about the technology but unaware about the specific benefits of the technology on a case by case basis.

The **IT Action** programme aims to change the focus to a 'market up' basis through a series of local programmes designed to meet the very particular needs of local communities. As mentioned in the main report, the IT Adviser Programme is fundamental to this. Advisers have recently (7 November 1995) been appointed in six of the ten Highlands and Islands LECs (Local Enterprise Companies - public sector economic development bodies). They will not compete with existing private sector consultants and suppliers, but will work with them to develop local markets. The Advisers key responsibilities are:

- to support the improvement of business competitiveness and effectiveness through I&CT;
- to support the implementation of local IT projects;
- to create new employment opportunities in the information sector;
- to act as the catalyst in the creation of local networks of expertise
- to support the local area in regional programmes and projects.

An Adviser, who has been employed in one of the areas for an eighteen months pilot project, has generated over sixty entirely new 'information' jobs by successfully 'selling' local skills in distant 'urban' markets.

The local Advisers are supported by a core team of four located in HIE (Highlands and Islands Enterprise - the regional public sector economic development body and parent of the local companies). The team is supported by BT (the area's sole fixed telecom network provider) through secondment and a close working partnership.

In addition to the support and co-ordination function, the core team are responsible for the development of major projects with area-wide implications (e.g. infrastructure, strategy, ENCATA and inward investment). The core team manage the operation of a regional network of expertise (i.e. the key players).

6. ENCATA: A European project with Highlands and Islands participation

The Highlands and Islands area, in partnership with a number of other rural/remote European regions is involved in the European Commission's ENCATA project within the Telematics Programme (TURA). The project budget is around £7 million (Sterling) over the next three years with 50% European funding.

Each region will audit local SME 'telematics' development and information requirements, and on the basis of the output, design and implement an action plan to meet the identified needs. It is currently envisaged that a range of 'Telematic Centre' models will be established and evaluated. These may range from high profile fixed centres, through small neighbourhood offices, to virtual centres and possibly even mobiles (vans).

Annexe 3. Information downloaded from AeRie (Applied Rural Telecommunications Information Service) on WWW

AeRie is sponsored by the Colorado Advanced Technology Institute (CATI). Contact Dr. Matt Hermes at mhermes@csn.net for links from AeRie.

http://www.yampa.com/aerie/

What follows is a mildly edited version of some of the information which it has collected.

Colorado Rural Telecommunications Projects (http://www.yampa.com/aerie/places.htm)

Applied Rural Telecommunications in Colorado

Citizens of fourteen Colorado communities developed independent projects benefiting their home towns. These projects enhance education, provide for upgraded rural medicine, help government meet its goals, develop commerce and provide an avenue for personal telecommunication through community networks.

In the Yampa Valley, more than 150 miles northwest of Denver, the community has established a local electronic bulletin board as the foundation for what it calls an "Information Utility". The county government communicates its business to the public across this medium. A new project will provide a wireless communications testbed.

In Summit County, ski country, the Chamber of Commerce established a central lodging reservation service. More than 90% of lodging establishments serving the Keystone, Arapahoe, Breckenridge and Copper Mountain Ski areas use the service to book lodgings directly from customer inquiries to the Chamber. A new effort will partner community and schools for Internet training and access.

Yampa Valley Clear Creek County - its steep slopes still full of minerals such as molybdenum, lead, even gold and silver - reaches out to connect its own citizens across the difficult terrain. And it entices visitors to its multimedia, interactive kiosk, with full-motion video, printer and telephone functions, allowing visitors a vivid look at the attractions of the old mining communities and ghost towns, the big-horn sheep clinging to the slopes, and the narrow-gauge railroad whistling an evocation of the nineteenth century.

How do we provide state-of-art health care across the sparsely-populated plains and mountain reaches of Colorado? The Colorado Rural Health Telecommunications Coalition aims to provide care and treatment information across the services of common carriers for rural health-care professionals and consumers.

Clear Creek County Washington and Yuma Counties identified critical telecommunications needs for their rural areas - distance, interactive video, Internet access in the schools and readily available agricultural information. As a first project they will bring toll-free Internet access to County High Schools.

Telluride, Colorado claims the largest fraction of on-line computer users in the world. Richard Lowenberg, of the Telluride Institute, states one-third of Telluride's residents are registered on

the Telluride InfoZone. This community network serves as conduit for debate, education, advice and government information. Perhaps the most significant single factor for success is that more than fifty town residents are currently contributing content to InfoZone.

Delta County in Colorado faces a simply stated problem, but a problem which is difficult to solve. This rural county has rich telecommunications resources at its VoTech center, but needs access to low-cost, high bandwidth transmission to educate its far-flung constituency and bring telemedicine to its hospital.

The Montrose Area Telecommunications Group, Colorado began with six months of community planning. They determined that affordable, on-line telecommunications was the first goal and began formulating a plan for a local bulletin-board system. Montrose hired consultants from Colorado University to help them understand local communications infrastructure. Montrose will also bring Internet access to its public schools.

In the San Luis Valley a Valley-controlled Web Server and bulletin board system will help develop a 'sense of place' for this geographically vast and culturally diverse community.

Early planning and the implementation of the work in Durango and Southwest Colorado has resulted in development of a fully functional local bulletin board called SCAN offering a developing flow of business, government, health and educational information. The community is experimenting with forming a publicly chartered corporation to run their information resources.

San Luis Valley's Trinidad State Junior College contracted to bring teleradiology capability to San Rafael Hospital in Trinidad from the Colorado Health Sciences Center in Denver. The project is complete and the community is beginning to assess the new telemedicine service.

The town of Gunnison developed an Internet connection through a Colorado Super Net point of presence (POP) at Western State College. Now, a Gunnison Bulletin Board is the second phase objective of Gunnison's telecommunications activity. Gunnison will develop a fiber-optic "spine" down Main Street to link city and county government, schools and health care services.

In the town of Lamar, a new project will bring training on the World Wide Web, expecting agricultural, medical, education and commercial benefit.

With a new project in Cortez, Montezuma County, Colorado, the community will experiment in marketing Mesa Verde County through the World Wide Web.

Other US activities noted on AeRie

Carroll County Georgia is probably not quite as rural as some of the Colorado sites, but it is still significantly a rural community. They have for about two years now been collaborating in a telecommunications alliance that has achieved some good results. Their model of an alliance is now being copied in several other rural Georgia communities.

Brief Notes:

* Washington State Economic Development Network.
* The Oregon State Department of Agriculture keeps State agricultural interests informed on a weekly basis.
* Cornell University gathers governmental information in New York State.
* Rural Florida Healthcare
* Teleradiology in Rural Pennsylvania
* The Virtual Hospital at the University of Iowa.

Canadian Rural Telecommunications

In Western Canada, the towns of Lethbridge and Canmore offer World Wide Web presence promoting regional tourism and the amenities of the region. Banff, Alberta is situated in Canada's first National Park 128km (80 miles) west of Calgary just inside the east gate of Banff National Park. Banff National Park has 6,641 sq. km of mountains, forests, rivers and lakes that is the habitat to abundant wildlife. The world famous Lake Louise is 58 km (35 miles) further west of Banff.

Canmore is located at the east gates of Canada's Banff National Park at the foot of the majestic Three Sister's Mountains. Canmore provides access to listings of the small firms helping to develop its infrastructure.

Lethbridge, in the Province of Alberta, invites new residents by displaying the City as a wonderful place to be.

Worldwide Projects

Here are a few other resources for rural telecommunication applications.

* Visit the Centre for Rural Social Research at the Charles Stuart University in New South Wales, Australia. The Center publishes "Rural Society", a quarterly, refereed Journal devoted to rural social issues.

* Richard Fuchs of The Enterprise Network in St. John's Newfoundland writes AeRie and notes that the Enterprise Network has operated a "rural informatics and telematics service in Newfoundland, Canada for 7 years. Our service includes our own network as well as 6 rural tele-centres for electronic business and economic development information and technology diffusion.".

* In South Africa, the Community Information Delivery System provides on-line access to hypermedia-based information. It provides products and services that promote connectivity to, and expansion of, the Information Highway. The current phase concentrates on wireless remote access, ATM high speed backbones, and Ethernet connectivity.

The AeRie Applied Rural Telecom Resource Guide

Welcome to AeRie's Applied Rural Telecom Resource Guide. The Guide provides rural communities throughout the United States and the world a toolkit of resources to help them meet their economic and community development goals using telecommunications. The Guide offers a directory of economic development resources, an overview of basic telecommunications concepts, a schedule of upcoming conferences and events, and background information on rural infrastructure.

The growth of the AeRie Resource Guide depends upon contributions from users like you. We seek your ideas for resources and applications that should be included in the guide. If there are any resources you know of that are not yet listed within, please submit them to AeRie.

CONTENTS
- Resources
- Overview of Rural Telecommunications
- Events and Conferences
- Rural Telecom Applications Directory of Worldwide Projects
- Additional Information

The Guide was developed by the Colorado Advanced Technology Institute, as part of the Colorado Rural Telecommunications Project, with funding from the Economic Development Administration, part of the U.S. Department of Commerce. The AeRie Resource Guide is maintained by Brian Geoghegan - bgeogheg@csn.net

The development resources are organized according to the following economic and community development sectors:

* Community Development and Public Access Networks
* Health Care and Telemedicine
* Education and Distance Learning
* Tourism and Regional Marketing
* Nonprofit and Social Service Agencies
* Agriculture, Ranching and Mining
* Business and Telecommuting
* Environmental and Natural Resources
* Government
* General rural development resources
* Overview of Rural Telecommunications
* Community Development and Public Access networks
* Role of Telecommunications in Rural Economic Development
* Basic Telecommunications Concepts
* Infrastructure
* Additional Information
* Recent Articles and Publications
* Telecommunications Glossary (http://www.yampa.com/aerie/resource/section4/glossary.htm)

Annexe 4: Guide to Internet Resources on Rural Telecommunications and Rural Development

1. According to Colin Pavey, seminar participant, the WWW search engine called 'excite' produces a vast number of 'hits' when searching on 'Rural Telecommunications'. The URP is "http://www.excite.com/".

2. Tim Walter, also a seminar participant, compiled the following collection of sites, resources and conferences used by rural development practitioners on the Internet and other computer networks. Tim calls this his Draft - Version III, on the grounds that new resources are appearing regularly on the net, and a guide such as this is always incomplete! Readers can help Tim by e-mailing him new information. Although at present the collection refers mainly to sites and resources in North America, which currently dominates the field, there are a growing number of WWW sites here in Europe which will be added to the list as readers respond.

Your Choices in Cyberspace...

Dear Colleague

This document is a collection of some sites, resources and conferences used by rural development practitioners on the Internet and other computer networks. You may use it as a starting point for locating economic and community development happenings in cyber-space. I add to the document on a regular basis, hence it is in perpetual "draft" format.

I catalogued these resources as part of my work to plan a strategy for the HandsNet Rural Issues Forum. I manage that forum with support from the Ford and Kellogg Foundations.

Two themes guided my thinking in putting together this collection, and I would ask you to please keep them in mind:

> **Computer networks are a communication medium, and using them can put you in touch with people who can help you solve problems.** Wandering around the Internet is inefficient because its content is disorganized, and even when it is organized, the information may be grouped in ways that don't fit your needs. Fortunately, we have ways to be interactive on the networks, meaning that we can get in touch with experienced colleagues who volunteer to help one another. These interactive tools are the "forums" or "bulletin boards" found on the private networks and the Internet e-mail lists and Newsgroups. These tools are, I would argue, the most important and powerful element of the Information Highway.
>
> **Finding information in the Internet jumble can be really tough, so there is still a use for data "intermediaries" like HandsNet and Lexis/Nexis that collect and digest information.** A lot of the data that is now available over the Internet was always available before in libraries, through the mail, or within a few phone calls to the right persons. Just because data is on the Internet doesn't now mean that a user suddenly becomes an expert in interpreting the data. Likewise, Internet data sources are not often collected in a single spot nor

arranged in usable digests. For this, you must spend money, and hence we have services like HandsNet, Lexis/Nexis, and DataStar.

The resources I have listed focus on items one would not likely find in guides to the Internet produced for the popular press. What you see here is an open-ended draft that may never be more than just a white paper or draft. I will try to update it in the course of my work and with the help of readers and friends.

To use the Internet resources listed here you will already need to be somewhat familiar with the Internet. I have not offered elementary explanations, so you may need to pick up a book on using the Internet from a local bookstore. Basically, everything outlined here is accessible with a computer and a modem and some patience.

This collection concentrates on Internet and subscription networks available to the public-at-large. I have not included information on efforts by a number of associations such as the American Economic Development Council and the National Business Incubator Association who are sponsoring networks for their members. I may gather details on these projects in the future once the networks are more developed - many are just now in the formative stages.

Please feel free to reach me at 202-736-5834 or via e-mail at either timothy@aspeninst.org or HN1005@handsnet.org with questions or feedback.

Sincerely,

Timothy R. Walter
Rural Telecommunications Initiative

Rural Economic and Community Development Resources On the Information Highway

Draft Version III
December 1995

Contents

1 Private Networks and Databases

The services outlined in this section require special subscriptions as opposed to the open areas of the Internet. While I have put them in the category of "data sources" some offer very rich conferencing forums. Section I lists some networks that are interactive, meaning they allow users to communicate with one another. The networks in Section I are also those one could use to access the Internet. Section II are the more expensive data services that catalogue massive numbers of journals and publications.

Section I:
Private Networks--Information Forums and Clipping Services:

Most of the information networks listed below offer a combination of clipping services, databases, and conference forums. Forums are discussion sites or bulletin boards some of which are merely for hobbyists.

HandsNet 408-257-4500
All the data on HandsNet is professionally oriented toward health and human services, economic development, sustainable agriculture, housing, and legal services. A number of foundations support information forums on HandsNet, all of which are included in the basic subscription price. Also available are Reuters, AP and BusinessWire abstracts with very easy to use search features priced at a premium over the regular hourly charges. Together with IGC (below) HandsNet offers a separate, inexpensive, yet full-featured Internet service including a NetScape browser.

IGC (PeaceNet, EcoNet, LaborNet, ConflictNet, WomenNet) 415-442-0220
One of the leading bulletin board and conferencing resources for social causes. IGC has a number of "unmoderated" conference areas, a handful of which relate to economic development. Much of the information is similar to what you can find on HandsNet, but more globally oriented. IGC charges a monthly subscription fee and then hourly charges.

Compuserve 800-848-8199
Has a rich variety of forums and some of the most serious users among business professionals. Compuserve charges premium prices for participating in its information forums which limits the interference of casual users. It offers a scaled-down version of Dialog and a service called "Executive News Service" which searches AP wire services for you; you are charged for your reading time at $15/hr.

America Online 800-827-6364
Widely popular, and less expensive than Compuserve. For the serious data seeker, this is not the place to be. Clipping service is available: Knight-Ridder, NYT News Service and others at $9.95/mo (although there may be a discount if you sign up by May 1995.)

GEnie 800-638-9636
Formerly the leader among the consumer services for business information, GEnie was one of the first to offer links to major news services. QuikNews clipping service costs $25/mo.

Delphi 800-695-4005
Made a splash with Internet service, now playing catch-up.

eWorld (Apple Computer; 1-800-775-4556)
Apple Computer's foray into the on-line world; unclear as to their success. May be a good network for Apple software entrepreneurs to communicate with one another.

Interchange (Ziff Davis; 1-800-595-8555).
A solid service for computer industry news based on the multi-magazine publishing venture of the Ziff brothers.

Microsoft Network
Having survived the US Department of Justice's challenges (for now) the MSN will be available to users of the Windows 95 software. MSN has been recruiting information providers, many of whom expect to sell their services online and offer MSN a cut of the proceeds.

To receive a comprehensive list of the information forums in Compuserve, AOL, and Prodigy, plus a list of all the journals and magazines accessed by Dialog et al., contact "Online Access" magazine, 1-800-366-6336, for the July/August 1994 back issue.

Section II:
Financial and Complete Periodical Libraries On-Line

These are major, expensive, information sources. There are others geared specifically to the financial services industry which I have not listed.

Dow Jones News Retrieval, 800-832-1234
60 Databases; 2,200 publications

Lexis/Nexis, 1-800-227-4908
$500/mo for first three months, after which you negotiate.
Comprehensive listings. Lexis is legal data. Owned by Mead.

Dialog (and Data Star), 800-334-2564
A scaled down version is available on Compuserve (for a fee of about $15/hr).
Full service is $295 setup and $70/hr.

DataTimes, 800-642-2525
5,500 publications on-line.
$39 setup, $.20/minute on-line, plus $3 per article.

CAN/OLE, 613-993-1210
Canadian databases.

Infoquest 800-554-0441

Info Globe Online, 800-268-9128

NewsNet, 1-800-952-0122

2 Internet Mailing Lists

The following section is a sample of the conversations that take place via the Internet using e-mail. Some of the lists relate directly to economic development. Others are shown to give an idea of the breadth of topics available. For instance, the list on "two-stroke motors" might be useful if you are helping a young entrepreneur locate a market niche. A few items are just for rural fun.

The descriptions for each list are a combination of my own experience and the "mission statement" offered by the list manager when available. I have tried to scout out the lists of rural interest and have sampled them whenever possible.

This compilation draws from my own work and from lists compiled by Munn Heydorn (HN3268@handsnet.org) and Stephanie da Silva (arielle@taronga.com). To find a complete list of Internet mailing lists, see the resources section at the end of this section.

Most listserv's use automated software that adds you to the group without any intervention from the list manager. Thus, each list has two addresses. One address is for commands to the computer that runs the list, the other address broadcasts your message to all the other people on the list. The simple rule to follow is that you send e-mail commands to the computer (such as "subscribe" and "signoff"). The computer address usually begins with "listserv" or "listproc" or "majordomo" which are all types of list management software. Below, the format I have used is to give the computer address following "To" and the command as the "Message."

Example: To sign up for the agmodels list, I would send a message to
listserv@unl.edu
with a one line message (the subscribe command) in the body of the e-mail reading:
sub agmodels-l Tim Walter.

A few lists are moderated, and ask only that you contact the list manager who will personally add you to the list.

Agmodels-l
Forum for agricultural simulation models of all types. Owner: jp@unl.edu (Jerome Pier).
To: listserv@unl.edu
Message: sub agmodels-l your name

Agwomen-L
To: majordomo@peg.apc.org
Message: subscribe agwomen-l

Agricultural Economics
To:listserv@umdd.umd.edu
Message: subscribe agecon-l Firstname Lastname

Agricultural and Rural Land Use
To: LISTSERV@LISTSERV.NET
Message: SUBSCRIBE CARLU

Agriculture (Sustainable)
Discussion is largely technical and academic.
To: almanac@ces.ncsu.edu
Message: subscribe sanet-mg

Alternative Energy
Alternative energy sources, renewable and sustainable, ie. solar, wind, geothermal, tidal, electro-chemical, hydro-electric.
To: LISTSERV@SJSUVM1.SJSU.EDU
Message: SUBSCRIBE AE firstname lastname

Appalachian Development
A new list for folks interested in economic development in Appalachia.
To: listserv@sjuvm.stjohns.edu
Message: subscribe AppalDev FirstName LastName

Appalachian Literature
A moderated forum for the discussion of Appalachian Literature.
To: listserv@msuacad.morehead-st.edu
Message: subscribe applit your name

Business
Incorporation, employee, leasing matters & answers via Brookfield Economics Institute.
Watch out--subscribing rules are unusual.
To: brookfld@netcom.com
Subject: SUBSCRIBE BBA [YOUR FIRST & LAST NAME]
Message: SHOULD BE LEFT BLANK

Community Development, "Participatory rural appraisal"
To: listserv@uoguelph.ca
Message: sub PRA FirstName LastName

Community Development (Urban)
Sponsored by the Urban Section of the International Community Development Society for issues such as homelessness, crime, immigrants and neighborhood organizing.
Contact al@u.washington.edu.
To: listproc@u.washington.edu
Message: subscribe cd4urban yourfirstname yourlastname

CommunityDevelopmentBanking-L
Discussion list for Community Development Financial Institutions.
To: ListProc@cornell.edu
Message: subscribe CommunityDevelopmentBanking-l your name
List manager: William Myers, at Alternatives- Myers@cornell.edu.

Community economic development in developed countries.
Managed by Community Economic Development Center of Simon Fraser U. in BC, Canada, which focuses on small-scale, sustainable development.
To: majordomo@sfu.ca
Message: subscribe CED-NET

Communities & networking.
Community computer networks & Civic Networking.
To: listserv@uvmvm.uvm.edu
Message: sub communet FirstName LastName

Community networks (Rural)
For folks trying to set up rural access networks and civic nets.
To "Majordomo@reeusda.gov" with the following command
in the body of your e-mail message: subscribe rural-comnet
For more info, contact Tom Tate, USDA/CSREES, ttate@reeusda.gov

Community revitalization
Including housing, education, arts, safety, recreation, business development.
To: plf!server@bts.com
Message: subscribe frkdplan FirstName LastName

Community Research
"Action Research" is a way of involving the community or organization in the learning process.
To: arlist-request@psy.uq.oz.au
Message: subscribe arlist
Also, for a list of papers on this, send the message: get ar_README

Conflict management.
To: listserv@listserv.net
Message: subscribe cmdnet-L FirstName LastName

Co-operative organizations.
To: listserv@ukcc.uky.edu
Message: subscribe co-opnet FirstName LastName

DEOS (Distance Learning)
DEOSNEWS is a bi-weekly journal delivered via e-mail. DEOS-L is a discussion list.
To: LISTSERV@PSUVM.PSU.EDU
Message: SUBSCRIBE DEOSNEWS Your Full Name
and/or
To: LISTSERV@PSUVM.PSU.EDU
Message: SUBSCRIBE DEOS-L Your Full Name

Economic Development
Discussion among economic development practitioners.
To: majordomo@pipeline.csn.net
Message: subscribe econ-dev

Economic and Social Development
Academic discussion of national economic and social development in developing countries.
To: mailbase@mailbase.ac.uk
Message: Subscribe econ-soc-devt FirstName LastName

Economic-growth
Discussion list about economic growth.
Owner: DSE.VANHOUDT.P@ALPHA.UFSIA.AC.BE (Patrick Vanhoudt)
To: majordomo@ufsia.ac.be
Message:
HELP
INFO economic-growth
END

Education, adult education network.
To: listserv@alpha.acast.nova.edu
Message: subscribe aednet FirstName LastName

Employment
Futurework, technology changes, low wages, globalization of labor.
To: listserv@csf.colorado.edu
Message: subscribe FW-L FirstName LastName

Internet: net-happenings digest
This is a newsletter of daily events related to the Internet reportedly run by a fellow from his basement in rural Montana.
To: majodomo@is.internic.net
Message: subscribe net-happenings-digest

Internet-advertising
The Internet-advertising mailing list is a forum for discussion
among business people interested in learning new ways to advertise on
the Internet.
To: LISTSERV@NETCOM.COM
Message:
SUBSCRIBE INTERNET-ADVERTISING THEIRNAME@WHAT.EVER
END

Job Counselling
This list is of interest to job search trainers, career counsellors, career specialists, researchers looking at the field of job search/employment, private practitioners and others who work or have an interest in the field.
To: LISTSERV@UKCC.UKY.EDU
Message: SUBSCRIBE JOBPLACE Yourfirstname Yourlastname

k-d-lang
Discussion of k.d. lang and her music.
To: majordomo@world.std.com
Message: subscribe k-d-lang <your.address>

Mayberry
Discuss the Andy Griffith Show and Mayberry RFD.
To: listserv@bolis.sf-bay.org
Message: subscribe Mayberry

Microenterprise
List focuses on microenterprise in developing countries.
To: listserv@devcan.ca
Message: subscribe enter-l Firstname Lastname

Nanci
Music and career of Nanci Griffith. Subscribing rules are a bit different:
To subscribe, send a note to: nanci-request@world.std.com.

Non-Metropolitan Development
This list is moderated by Mike Gurstein of the University College of Cape Breton in Australia; he does a good job monitoring other listserves and posting relevant material from rural-dev and a few others. Many subscribers are Canadian and Australian.
*Watch out--the rules are different for subscribing to this list...*send a *blank* message to the address: non-met-dev@chatsubo.com
with the command: subscribe in the *subject* line.

Physical Medicine and Rehab in Rural/Community Setting
To: listserv@listserv.net
Message: SUBSCRIBE REHAB-RU
(I guess this is related to the list rehab-ru found at listserv@ukcc.uky.edu ?)

Rural Datafication
Subscribers periodically receive information on the Rural Datafication project. It is not interactive. See also www.cic.net.
To: ruraldata-info@cic.net
Message: subscribe ruraldata-info [ADDRESS]
(note that [ADDRESS] can be your e-mail address or your name)

Rural Development (United States)
List of rural economic and community developers. About 400 people participate, and the list is over 3 years old. It is quite a powerful tool.
To: listserv@ksuvm.ksu.edu
Message: sub ruraldev Firstname Lastname

Rural Development - International (Arkleton)
A list sponsored by the Arkleton Trust in the UK, has a more European flavor than ruraldev listed above. (See also rural telecom list under telecom below.)
To: mailbase@mailbase.ac.uk
Message: join arkleton firstname lastname

Rural Education (AERA SIG)
To: listserv@listserv.net
Message: subscribe RURSIG-L

Rural Families
Newsletter and discussion forum for the Rural Focus Group of the National Council on Family Relations and other professionals interested in rural family research, teaching, rural service delivery systems, and policy related to rural families. Owner: Charlie Griffin: CGRIFFIN@ksuvm.ksu.edu.

To listserv@ksuvm.ksu.edu
Message: sub RURALFOC your firstname your lastname

Rural Health Network
To: listserv@wvnvm.wvnet.edu
Message: subscribe wvrk12-L FirstName LastName

Rural History
Rural historians list, it is pretty active and friendly. Unlike other open lists, H-Rural has two moderators who must add you to the list. Send an e-mail message to either of them explaining who you are and your interest in the list. Contact John Hannum: jhann00@ukcc.uky.edu or Jim Oberly: joberly@cnsvax.uwec.edu.

To: listserv@listserv.net
Message: SUBSCRIBE H-RURAL

Rural Internet Access
The list may soon be active as part of a National Science Foundation project to study rural Internet access problems.

To: listproc@itc.org
Message: sub rural yourname

Rural-L
I think this was for a course at a Vermont community college. It may not be active.

To: listserv@vtvm.cc.vt.edu
Message: subscribe rural-l firstname lastname

Rural sociology.
To: listserv@ukcc.uky.edu
Message: subscribe rursoc-L FirstName LastName

Rural Public Administration
To: LISTSERV@LISTSERV.NET
Message: SUBSCRIBE RPA-L

Rural trends & conditions.
I think this one is no longer active, but maybe you'll have luck.

To: listserv@listserv.net
Message: subscribe ruralusa FistName LastName

Rural women.
The list is not very active, but does have about 50 members and a lot of potential.

To: listserv@bingvmb.cc.binghamton.edu
Message: subscribe rurwmn-L [YOUR FIRST & LAST NAME]

Software Entrepreneurs
The Software Entrepreneurs Mailing List is devoted to
the interests of entrepreneural software publishing, including
(but not limited to) shareware.

Contact: softpub-request@toolz.atl.ga.us (Todd Merriman)

Sustainable Development
If you want to participate in discussion on sustainable development, subscribe to the sustainable development mailing list by sending the following command in e-mail:

To: Majordomo@world.std.com
Message: Subscribe sustainable-development

Telecom - Rural
This list was originally created for participants of a meeting sponsored by the Arkleton Trust on telecommunications development in rural areas. Participants on the list come from the US, Canada, and Europe.

To: mailbase@mailbase.ac.uk
Message: join arktel firstname lastname

Telecom-Tech
Discussion of the various technical aspects of modern and historical telecommunications, plus legislation. The list is mirrored with the comp.dcom.telecom.tech newsgroup.

To subscribe, contact: TeleTech-Request@zygot.ati.com

Telecomdocs
A moderated forum for the distribution of telecommunications rules, regulations and other official communications. List owner: owner-telecomdocs@relay.adp.wisc.edu

To: listserver@relay.adp.wisc.edu
Message: subscribe telecomdocs <your name>

Telecomreg
Discussion of the regulation of telecommunications. List owner: borton@macc.wisc.edu

To: listserver@relay.adp.wisc.edu
Message: subscribe telecomreg <your name>

Tourism - rural
There are about 4 lists active relating to tourism. You can find out about them at the WWW address http://199.104.90.100 or the USDA Extension Service www site. I think the list address is MajoDomo@esusda.gov (primary list name: tourism) but I can't get the USDA computer to respond to me.

Two-Strokes
Discussion of two-stroke motorcycle technology (important for dirt bikes).
Contact: 2strokes-request@microunity.com

West Virginia
Discussion list for issues related to the state of West Virginia. Local news, politics, travel, expat homesickness, all are welcome here. Contact: kieran@phantom.com or adickey@muvms6.mu.wvnet.edu (Aaron L Dickey).

To: majordomo@world.std.com
Message: subscribe wva-l

3 Internet Mailing List Resources

List of Lists by Interest Group
This file provides a list of various discussion lists grouped by subject.
To: mail-server@sri.com
Message: send interest-groups

The file is available for anonymous FTP from host crvax.sri.com (128.18.30.65) in the netinfo directory.

List of Community/Rural Electronic Mailing Lists
This is a popular compilation by Art McGee. Send e-mail to amcgee@netcom.com or via ftp in the directory pub.amcgee/community at ftp.netcom.com. You can ftp it via e-mail by sending the command help to the address ftp-request@netcom.com.

Comprehensive List of Lists:
For a *comprehensive* list of lists:

To: LISTSERV@VM1.NODAK.EDU
Subject: SUBSCRIBE
Message: LIST GLOBAL

NOTE: You can send this message to any listserv and use that message in the body and get back a full list of mailing lists.

If you want to refine it, try sending a message that says:
list global/business or
list global/poetry or
whatever kind of lists you are after.

[This information on comprehensive list of lists was revised from postings from Bruce Roberts, bruce@tsbme.texas.gov and Steve Snow, shsnow@cybernetics.net of the List, COMMUNET@uvmvm.uvm.edu.]

4 Internet Newsgroups

There are reported to be over 10,000 newsgroups active on the Internet. I downloaded a list of these and scanned it to pick out a few that might be of interest to a rural business developer.

alt.appalachian
alt.community.local-money
alt.sustainable.agriculture

misc.rural
sci.environment
sci.agriculture
sci.electronics
sci.engr.manufacturing
sci.bio.fisheries

The misc.rural group has a very "homey" feel to it. Most of the postings relate to solving problems associated with rural living. For instance, I saw inquiries such as "My goat keeps fainting," and "Can I put turkeys in with my chickens." It is a remarkable newsgroup, to think that ordinary rural residents are using this global computer network to answer every-day problems.

Most newsgroups are hobby-oriented, with discussions on many TV shows, music groups, and crafts. There are few professionally oriented newsgroups, with those in the scientific fields best represented.

However, newsgroups have become much easier to use than they were only months ago, and with that change will come further development in the number of topics carried.

Newsgroups have the potential to be a good source for interactivity on the Internet.

5 Internet WWW Sites

This list is not comprehensive, rather it is a solid starting point. Some of the sites shown are "mega-directories" for economics. Other sites may be important within their subject area but which may be overlooked in the mega-directories or in Internet guide books. You can reach the regional rural development centers through the USDA.

> The following addresses should all be preceded by **http://.** If an address does not work right away for you, perhaps because of a typo or a mismatch with upper and lower case letters, try opening the first part of the address and then browse your way deeper into the site.

Business Assistance (Small Businesses)

www.sbaonline.sba.gov (US Small Biz Admin)
www.lowe.org (small business entrepreneur support center--the kitty litter site)
ra.cs.ohiou.edu/gopher/dept.servers/aern/homepage/nbia.html (Nat'l Biz Incu. Assoc.)
www.aiea.ualr.edu (Ark Inst for Econ Advancement)
silcom.com/incube/ (virtual incubator)
www.thomasnet.com (the Thomas Register--don't expect it to be free)
gopher: chimera.sph.umn.edu (Management archive at U MN) (gopher)
gopher: niord.shsu.edu (Sam Houston St. U., great business site) (gopher)

Civic Networks

www.sils.umich.edu/Community/Community.html
www.nptn.org (Nat'l Public Telecomputing Network. Good rural access solutions.)
www.morino.org (Morino Institute; a good locator service)
philadelphia.libertynet.org (Leading edge city-network)
www.civic.net & libertynet.org/~edcivic/iscvhome.html (Ed Schwartz)

Cooperative Business Networks (a small sampling)

www.svi.org (Smart Valley Initiative)
www.texas-one.org (Texas statewide business network)
www.industry.net (for profit example of suppliers advertising products)
www.commerce.net (a more interactive supplier network funded by NIST)

Community Revitalization/ Community Building

cdinet.com (Information on Millennium project and Benton Foundation)
www.scn.org/IP/cds (Community Development Society)
www.infoanalytic.com/cds/ (Canadian Development Society)
www.ezec.gov (Federal Empowerment Zones)
action.org (Action Coalition)
www.civic.net:2401/lgnet (local government resources)
www.grc.org/cec/pubs3.html (Gildea Community Sustainability proj.)
www.igc.apc.org/gain/ (Global Action Information Net--sustainable dev.)
iisd1.iisd.ca (Int'l Inst. Sustainable Development)

Distance Education

wwwhost.cc.utexas.edu/world/instruction/index.html (World Classroom)
infosys.kingston.ac.uk/Erasmus/open_access.html (virtual university)
www.assiniboinec.mb.ca/www/disted/listofr.htm (Aussie community college)
www.uwex.edu/disted/home.html (linking page)

Development Banking/Loan Funds

http://titsoc.soc.titech.ac.jp/titsoc/higuchi-lab/icm/index.html (Japan, links to US)
http://www.u-net.com/gmlets (barter/local currency news)
www.essential.org/gis/cra.html (Community Reinvestment Act maps)

Ecological Economy/Progressive Economy

www.igc.apc.org (Institute for Global Communications, I think)
www.mojones.com/mojo_interactive/opportunity/opportunity.html (Mother Jones)
kabir/umd/edu/miiee/miiee.html (U. MD Ecological Economy project)
infosphere.com/aspen/rockymtn/rmi_homepage.htm
www.ciesin.org (Information for a Changing world)

Econ Dev Agencies (just a few; there are many)

www.palouse.org (Project 509 regional effort in US northwest)
www.ded.state.ne.us (Nebraska Dept of Econ Dev)
www.geninc.com/geni/USA/ (Global Exposure Net; real estate, travel, Chambers)

Entrepreneurship

sashimi.wwa.com/~notime/eotw/EOTW.html (Entrepreneurs on the Web)
gsia.cmu.edu/research/entrepreneurship.html (Carnegie Mellon)

Federal Grants for Nonprofits

gopher://gopher.os.dhhs.gov:70/11/Topics/grantsnet (not a WWW site--no http)

Housing

www.ai.mit.edu/people/ellens/Non/online.html

Human Services and Health

www.handsnet.org/handsnet (HandsNet--children, health reform, etc.)
ruralnet.mu.wvnet.edu (Rural Health)

Jobs/Employment Services (just a few samples)

www.careermosaic.com/cm/home.html (Career Mosaic company)
www.monster.com (Monster list. Employers list company profiles here.)

Literacy and Education (just a few)

cosn.org (Consortium for School Networking, has a rural focus)
archon.educ.kent.edu (Ohio Literacy Center, includes links)

Locator Sites with Good Links to Economic Data and other WWW Sites

econwpa.wustl.edu/EconFAQ/EconFAQ.html (economics resources on Internet)
www.directory.net (Commercial WWW Sites)
www.fedworld.gov (US Government)
www.brandonu.ca/~ennsnr/Resources/Welcome.html (go here when you're lost)
www.law.vill.edu/Fed-Agency/fedwebloc.html (Federal Web site locator)
home.mcom.com/home/internet-index.html (Yahoo)

Nonprofits

asa.ugl.lib.umich.edu/chdocs/nonprofits/nonprofits.html
www.aspeninst.org (Nonprofit Sector Research Fund)
www.igc.apc.org (Institute for Global Communications)

Planning

www.uwm.edu/People/mbarndt/mindex.html (participatory planning)

www.webcom.com/pcj/welcome.html (Planning Commissioners Journal; takings)
www.worldweb.net/trust/ (National Trust Hist. Pres. & Main Street prog.)
arch.buffalo.edu:8001/internet/ (City planners internet resources)

Rural Development Generally, USDA, Farm Bill, Ag, Other

www.usda.gov
www.ksu.edu/~rcled (Rural resources linking page)
www.aspeninst.org/dir/polpro/REPP/REPP1.html (Aspen Rural Prog)
gopher://gopher.ext.edu (USDA extension service)
unlvm.unl.edu (lists of Farm Bill reports)
www.lib.lsu.edu/sci/njc.html (Not Just Cows)
www.csu.edu.au:80 (Center for Rural Social Research, Australia)
or www.csu.edu.au/research/crsr/linkcomm.htm
or www.csu.edu.au/research/centre.htm

Tech transfer

iridium.uca.nttc.edu (National Technology Transfer Center)
nctn.hq.nasa.gov (NASA)
www.gtri/gatech/edu (Georgia Tech)

Telecom and Interactive Communications

melc1.eas.asu.edu (Telecom Research Center)
www.policy.net (Rural Consumers Coalition on Telecom)
arkleton@mailbase.ac.uk (Arkleton Trust)
www.wiltel.com (Wiltel networking company)
cdinet.com (Benton Foundation Communications Project)
www.aspeninst.org (Aspen Communications and Society Program)
www.yampa.com/aerie (rural telecommunications page)

Telecottages/Telecommons/Televillages

www.gilgordon.com
tdg.res.uoguelph.ca (U of Guelph, Canada)

Tourism

199.104.90.100 (OuR Town tourism project)
www.icomos.org/Internet_Resource_Guide.html (Heritage resource guide)
www.colorado.edu/USTTIN/nrtf/nrtf.html (US Nat'l Rural Tourism Fdn)

6 Groupware

The concept behind groupware is that of "shared minds." With the aid of computers and a change in our work habits, we greatly increase our efficiency. One rural developer calls this "electronic collaboration that leads to purposeful action."

The term 'groupware' refers to a type of software. Today, an increasing number of WWW site managers are incorporating groupware features in their WWW sites. The providers listed below were established before this trend, but these companies are all solid enough that they will likely evolve to web-based systems.

HandsNet
Connect, Inc. 408-257-4500
HN Operates on the CONNECT system out of Cupertino, CA. The Aspen Institute's Rural Economic Policy Program is operating a 'learning cluster' using the HN system. It was selected in part based on its ease of use, the ability to work off-line, access to a low-cost 800# (good for rural areas), national connectivity, and the power of the system. By power, I mean that users can easily create new conversation areas, jointly edit documents, and move files around in the system. The system also provides Internet e-mail.

USnet, a project of Regional Technology Strategies (919-933-6699) directed to flexible manufacturing networks, also chose the CONNECT system. Brokers will be able to share experiences and query one another, create a file library, and receive and send e-mail.

FirstClass
SoftArc, Inc. 905-415-7000
FirstClass is exploding in popularity. It provides a fun user interface, real-time conferencing, and great remote access. Thus, it works well for e-mail within the office and wonderfully for connecting people around the country. Unlike HN above (and like all the other products below) your organization installs and operates FirstClass on your own server. Thus, you have to maintain the telecommunications connections (including the Internet connection.) FirstClass will tell you of consultants or providers in your area if you want to contract out the work. The features are similar to those of HN above and LotusNotes.

Caucus
703-243-6622
The Caucus software system has been famous for 'scrolling' conferences. Instead of clicking on each individual's contribution in a dialogue, the entire stream flows in front of the reader. The system has recently been configured for the www. The best way to see it is to visit http://www.tmn.com or call The Metasystems Design Group at 703-243-6622 in Arlington, Virginia, USA.

CoSy
1-800-663-7560 tel
The CoSy system was one of the earlier conferencing systems that allowed users to share e-mail and messages, and was used for distance education. You can find a demonstration on the www at http://www.softwords.bc.ca/CoSy.html or contact the company directly at:
Softwords Research International Ltd.
4252 Commerce Circle, Victoria, BC Canada, V8Z 4M2
604-727-6522 or 1-800-663-7560 tel
604-727-6418 fax

LotusNotes
Lotus, 617-577-8500
LN is supposed to be the savior of the Lotus corporation. The product has better database functions than the two above, which is useful for financial applications and for companies that need to share data across departments around the country. LN is expensive (though there are discounts for nonprofits) and more difficult to set up than FirstClass.

GroupSystems
Ventana Corporation, 800-368-6338

--and--

VisionQuest
Intellect Corporation, 800-856-6338

These are two of the early entrants to the groupware business and they have chosen the most difficult route to success. The products are used to automate meetings--brainstorming and voting take place on-line. This mode of interaction radically changes interpersonal dynamics while speeding up the flow of information and improving the decision-making in a meeting. The benefits of the software thus also threaten traditional power structures. On-line and anonymous, the participant in an electronic meeting who is best able to articulate an idea can win the day over a peer who is "favored" by senior managers.

This is a breakthrough technology; right now it works best within a single location, but the lessons and experiences from its use are being transferred to the groupware that permits "wide-area" interaction such as those listed on the previous page.

7 Rural Access Resources

As you know, getting access to the Internet from rural areas can be expensive due to long distance charges. Service can also be skittish due to low quality phone lines. A number of providers are beginning to offer 800#'s for access. A few of these are listed below.

Internet Providers
Institute for Global Communications (IGC) & HandsNet runs a large Internet service that is used around the world by economic and social development professionals. They charge a monthly subscription fee (like AOL and Compuserve) for access to hundreds of discussion groups. They also offer Internet access via 800# for $5/hr. Contact IGC in San Francisco at (415) 442-0220.

America Online offers an 800# for their members that adds about $4.80 to the hourly charge of using AOL.

Two other Internet providers that I have not tested at all but which offer the $5/hr 800# are: Concentric Research Corporation, (800) 745-CRIS and Internet Online Services, (800) 245-8000. MCI's new Internet service costs (I think) $6.50 per hour over an 800#.

Civic Networks

Civic Networks are also viewed as a good way to get access to the Internet. These are community-based bulletin board systems. Many of them operate under the name "Free-Nets." The National Public Telecomputing Network has a business plan and operations manual for establishing these in rural areas. Contact Dennis Hoops, NPTN-Rural Information Network, Box 1987, Cleveland, OH 44106, 216-247-5800, info@nptn.org (e-mail), http://www.nptn.org (WWW site).

One of the best known rural civic networks is the Big Sky Telegraph. Its founder, Frank Odasz, is an proponent of low-cost access to networks--if there is a way to get access cheaply, Frank will know how to do it.

For $12, a printed BST Class Starter Packet plus a three disk set: (1) a demo disk showing BST, (2) a disk of the best of the best Internet introductory guides, and (3) an offline reader disk.

For $3/topic they provide information packets on:
* How to Create and Teach an Online Class
* How to Create and Conduct a Multiclassroom Telecurricular Project
* Community Networking Solutions
* Indigenous Empowerment Networking

Big Sky Telegraph
Western Montana College of the University of Montana
710 S. Atlantic, Dillon, MT 59725-3598
(voice)406-683-7870, (modem)406-683-7680, (fax)406-683-7869
or telnet to: 192.231.192.1 and type bbs at login.

National Distance Learning Center

NDLC keeps a database of courses offered via distance learning (e-mail, cable, etc.).
Contact NDLC at (502) 686-4556; Owensboro Community College, 4800 New Hartford Rd., Owensboro, KY 42303.

USDA

The USDA Cooperative Extension Service is working hard to provide info highway access to the rural areas where its offices are located. Contact your local extension officer for assistance.

The Rural Information Center is available online via gopher, www (www.usda.gov), telnet (fedworld.gov) and dial-up (301-504-6510). For information call 1-800-633-7701.

The Rural Development Partnership operates its own bulletin board service called RDnet. Subscriptions on the service are subsidized by USDA giving users access to the service via an 800#. The system is tough to use, and thus is only actively used by those who are most committed to the Partnership initiative which aims to support the development and functioning of 38 State Rural Development Councils. Contact Tom Unruth at 202-690-4749.

The USDA has explored many ways to get their information out to folks who are not on the Internet. For instance, they operate a "state facts" data service that comes via fax. For more information on fax-on-demand or data retrieval via dial-up bbs contact your local USDA Extension office or contact the USDA Economic Research Service at:

US Department of Agriculture
Economic Research Service
Data Services Center, rm. 308
1301 New York Ave., NW
Washington, DC 20005-4788
Tel: 202-219-0491

WWW By E-Mail
A recently publicized innovation is the ability to retrieve WWW documents via e-mail. This method does not allow you to "browse" the Internet, but you can collect information that otherwise would not be sent to you. This can be useful in rural areas where Internet access is expensive.

Sample of how to retrieve WWW homepage information by e-mail:

1. Address your request to: listproc@www0.cern.ch

2. Text body message should read like the following. Send is the command and the http://www.magi.com/~aim/trdev.html is the WWW address:
send http://www.magi.com/~aim/trdev.html

Remember UNIX is case sensitive so watch your capitalization.

You can read more about this technique in published guides to the Internet.

TIMOTHY R. WALTER
Rural Telecommunications Initiative
Rural Economic Policy Program
timothy@aspeninst.org OR HN1005@handsnet.org

Canadian sites added by Heather Clemenson

Canada's Schoolnet
http://schoolnet2.carleton
Community Access Project details
http://cnet.unb.ca/cap
C*Net, the WWW site supporting the Community Access Project
http://cnet.unb.ca/cnet
The Information Highway Advisory Council
http://info.ic.gc.ca/info-highway/ih.html
Agriculture and Agri-Food Canada
http://aceis.agr.ca
Canadian Rural Information Service (new site February 1996)
http//:aceis.agr.ca/cris

UK sites added by John Bryden
Information on the Internet about the Scottish Rural White Paper

This White Paper "Rural Scotland" can be found at:
http://www.hmsoinfo.gov.uk/hmso/document/r-scot/r-scot.htm
"Rural Framework: A Progress Report" is at:
http://www.hmsoinfo.gov.uk/hmso/document/r-frame/r-frame.htm
and "The White Paper Consultation: the Rural Forum Report" can be found at:
http://www.hmsoinfo.gov.uk/hmso/document/r-forum/r-forum.htm

The amateur anthropological association (aaa).
An interesting attempt to relink anthropology and society.

Send an e-mail to mailbase@mailbase.ac.uk with a one line message as follows:

join small-triple-a <firstname lastname>

REAPER
A network of researchers and practitioners in 16 west European countries who are compiling information on rural social science research projects, and undertaking some assessment of gaps etc. Coodinator is John Bryden of The Arkleton Trust and Arkleton Centre for Rural Development Research at Aberdeen.

To join send a one line message to
mailbase@mailbase.ac.uk
saying
join REAPER <first name, last name>

Annexe 5 From Cultural to Information Revolution. Michael Wolff

Bill Gates may be the leader of the first phase of the information revolution, providing universal application tools for the world's high powered desktop computers, but ordinary people in faraway countries are spearheading the second stage. Chen Jian is one of these hitherto unknown pioneers.

While Gates, backed by his army of programmers in Seattle, struggles to find gold on the Internet, mild-mannered, bespectacled Jian has found the lode and is already mining it. Having recently given up his secure job as a CAD manager in Changzhou, China, he is now part of a global virtual team called Ki Net, and brings in more than the top earners in his city. His team happens to be focused on Web promotion services, but they could be providing any business service. Separated physically by thousands of miles but working together in a "virtual" office via the Internet, Jian and Ki Net are demonstrating how work that was once only performed in traditional office settings can now be accomplished in home offices just as efficiently. Even better, it's at a fraction of the cost of maintaining full time office staff, and has virtually zero impact on the environment.

Michael Wolff, the Scotland-based coordinator of Ki Net, explains: "China's recent connection to the Internet was one of the last pieces of the puzzle needed to make virtual teams both effective and seriously competitive. It is one of five essential, low cost, and universal ingredients for success, namely:

- desktop computing with standard applications, such as the Pentium PC with Microsoft Office;
- networking facilities supporting the exchange of documents and files now provided through the Internet;
- e-mail, shared filing and document management, work flow and procedure processing systems, co-authoring systems, and team development and coordination techniques;
- highly skilled home workers who have reorganised their own lifestyles and earnings expectations, are motivated to work as "virtual" team participants on a per-contract basis, and may be willing to trade lower incomes for improved quality of life;
- access to the highest-quality and lowest-cost skills in the global market regardless of geographical location.

"With access to people like Jian, many complex business processes now performed in conventional offices as we know them in the West can be done at a fraction of the cost."

So, should the advent of virtual organizations cause office workers in London and New York to shake in their Armani boots? Not yet. Jian, one of the first to be working in this way, does not belong to a whole army of virtual information workers. China Telecom first connected a

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