



PACIFIC ISLANDS FORUM SECRETARIAT

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*Apia, Samoa
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AGENDA ITEM 8

**STRENGTHENING DISTANCE EDUCATION THROUGH WIRELESS RURAL
NETWORKING IN SOLOMON ISLANDS**

This paper was prepared for the Forum Secretariat by Mr David Leeming of the People First Network in Solomon Islands.



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Summary brief

STRENGTHENING DISTANCE EDUCATION THROUGH WIRELESS RURAL NETWORKING IN SOLOMON ISLANDS

Purpose

This paper presents a case-study of an ICT initiative in Solomon Islands.

Background

2. The Forum Basic Education Action Plan noted that the development of information technology had greatly advanced the infrastructure available for the delivery of all education services and urged that institutions involved in education services make greater use of this technology.

3. The Forum Communications Action Plan also provides a vision: 'Information and Communication Technologies for every Pacific Islander'.

Issues

4. This paper describes an innovative approach to connectivity for remote, rural and underprivileged communities in Solomon Islands and how it has been applied to deliver education to remote island communities. The People First Network, or PFnet, was established by UNDP in 2001 but is now organised as a not-for-profit activity. PFnet has piloted a model for sustainable community-owned rural access based on wireless networking.

5. The paper also describes the application of the network to distance education. It demonstrates the utility of the technology and the immediate benefits to students and facilitators, and outlines a proposed EU-funded program that will build on the lessons learned, led by the Ministry of Education.

Recommendation

6. Ministers may wish to consider noting the contents of this paper.

Strengthening Distance Education through Wireless Rural Networking in Solomon Islands

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Background

1 In a country such as Solomon Islands, which is recovering from ethnic conflict, good communications are a vital part of rebuilding peace. Furthermore, as 85% of the country's people live in isolated rural villages on undeveloped outer islands, it is essential to find ways to engage these disadvantaged poor in the new Information Society. The People First Network (PFnet) [1] is a project that aims to do just this.

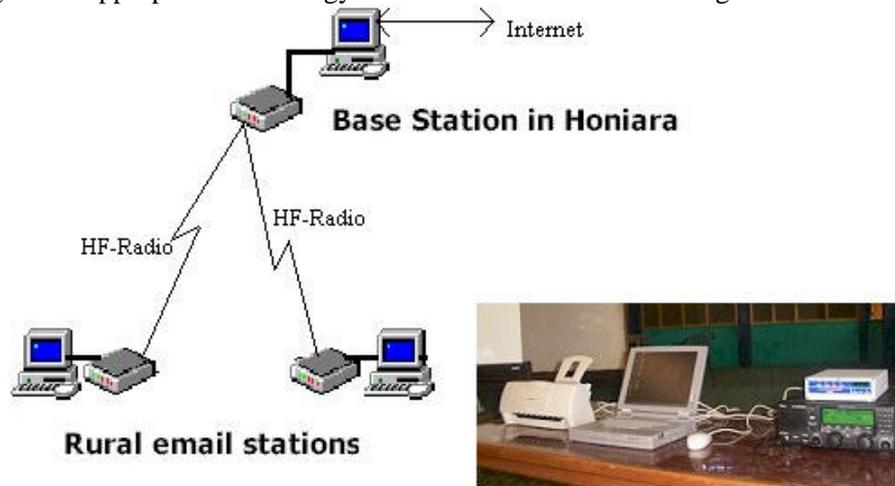
2 PFnet, which has been running since it was established by UNDP in early 2001, aims to promote and facilitate equitable and sustainable rural development and peace building by enabling better information sharing and knowledge building among and across communities forming the Solomon Islands. The project has established a wireless email network based on sustainable community ownership and is now working with partners to develop applications in many sectors, including distance education, farmer's networking, grassroots news, business and market advisory, consultations on constitutional and policing reform, rights awareness and women's networking. Institutionally, the project is now an activity of the Rural Development Volunteers Association (RDVA) in partnership with the Ministry for Provincial Government and Constituency Development.

3 Those embracing ICT in the service of development can expect many benefits. In small-island developing states such as Solomon Islands, however, there are many constraints and challenges to be faced if ICT is to be introduced widely. Some of these challenges are "hard"; i.e. the geography, the regional telecommunications market, lack of infrastructure, etc. Others are "soft", in that they are related to lack of awareness, training and appropriate guidance and strategy for policy makers. These problems have been compounded by years of ethnic conflict and economic collapse, culminating in an Australian-led intervention in June 2003. This paper illustrates some of the constraints and challenges PFnet faces and highlights an application of the network in distance education.

Geographic and other constraints on technology

4 Most of the Solomon Islands does not have access to power supplies or telephones. Mountainous islands, customary land ownership and civil unrest make infrastructure vulnerable to vandalism, theft and closure due to compensation claims. The high cost of satellite access prescribes wireless technology as the only practical, affordable solution for rural communities. However, the distances and terrain make high-speed wireless connection of use in only certain areas close to urban centres. With these constraints in mind, PFnet has developed a solution utilising the HF (SW) band, with Pactor-3 modems and solar power. HF systems are very easy to install and maintain, do not require vulnerable and hard-to-maintain relay sites and do not require intensive training to operate.

Figure 1: Appropriate technology for sustainable rural networking in Solomon Islands



5 There are also constraints imposed by the regulatory environment. As in many Pacific countries, there is a telecommunications monopoly in the Solomon Islands. In a small marketplace with high costs and a small pool of skilled labour and government capacity to regulate, it may be more practical for all parties to work in partnerships. Such partnerships could benefit an NGO such as PFnet through sponsorship and access to telecommunications solutions that would be otherwise prohibited by the regulations. Furthermore, such a partnership would give the company access new markets through participation in appropriate donor-funded projects of the government in partnership with NGOs and the development agencies. We see, therefore, that value is added for each of the parties involved.

6 Furthermore, we see that such tri-sector partnerships, involving the private sector and NGOs in government development strategies, are strongly advocated in development circles. For instance the UNCP ICT Task Force make this point, which is also reiterated in our region in the Tokyo Declaration of the WSIS. More fundamentally, we see that the Millennium Development Goals ask us to “develop a global partnership for development” through cooperation with the private sector, especially to bring the benefits of new technologies such as ICT. In the special circumstances of the Pacific islands small developing states, it seems likely that such partnerships are essential if we are to connect the remote rural communities.

ICT and National Development Strategy.

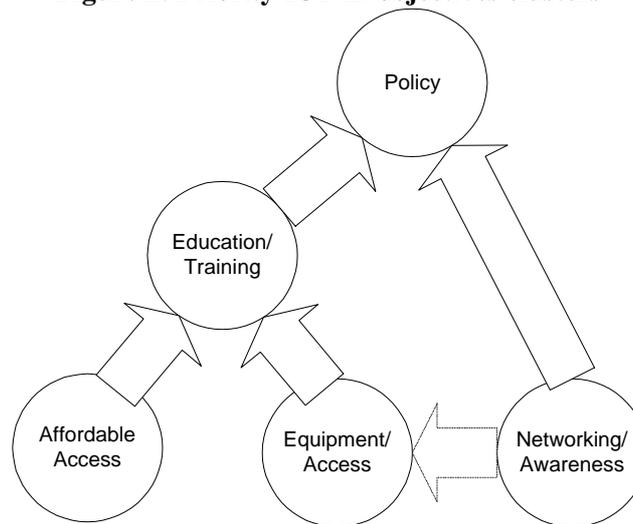
7 Ideally, the incorporation of ICT in policy making should be guided by a national ICT strategy if the benefits described by UNDP [3] and others are to be enjoyed. In Solomon Islands there is no such strategy in place, although there is a regional plan and strategy[4] developed by Forum Island countries. Because of the crosscutting nature of PFnet, the project has particularly noticed the lack of focus and haphazard way in which ICT is utilised by the government and development partners alike. Lack of awareness of ICT and it’s potential role in national development, together with lack of ICT skills seriously hinders the appropriation of these useful new technologies at policy-making levels. Coming and going of political personalities and public servants who may or may not be briefed on ICT4D issues has affected the level of support which the project expects from it’s government partners.

8 A workshop was held for stakeholders in February 2003 to identify, analyse and prioritise objectives on national issues related to ICT for Development (ICT4D). The workshop built

consensus and was intended as the first step towards the development of a National ICT Strategy. Attendees included government workers including a Minister, members of NGOs, the private sector, donor agencies and civil society organizations.

9 The associated “objectives tree” was then mapped and five major clusters identified, whose relationship is illustrated in Figure 2. The diagram shows that, if ICT is to be considered and used to best effect within government policies and development strategy, there is a need to first address the underlying issues. It does not mean that no policy development can incorporate ICT before these objectives are realized, but the impacts will be less and more isolated and haphazard in nature.

Figure 2: Priority ICT4D objectives clusters



10 The final report of the workshop has been published [5] and is intended to provide guidance for policy makers. The workshop also resulted in a steering group, the Solomon Islands ICT Working Group, being formed to follow up the workshop. The Working Group is to be included in the regional e-Pacifika program [6], which is building the capacity of regional countries to develop ICT strategies.

ICT in education in Solomon Islands

11 The strategic objectives clusters in figure 2 clearly show how more ICT content and training is needed in education, from the standpoint of national development. This defines the focus of the rest of this paper.

12 There is a lack of baseline data on ICT and Education in the Solomon Islands. This data would enable better targeting and more effective strategising.

13 A very few schools in urban areas have been building IT strategies and acquiring equipment. This seems to be more as a result of enlightened school management than official IT strategy. For instance Betikama Adventist College claims it has an in-house IT strategy in place and have acquired 10 donated computers. However, they have had problems implementing the strategy due to lack of support from technicians and inadequately prepared facilities.

14 In rural areas the problems are compounded by lack of basic power and communications, poor transportation and a shortage of resource materials. The economic consequences of the civil unrest

has had serious negative effects on the ability of the Ministry of Education to continue financing overseas post secondary scholarships and Solomon Islands College of Higher Education (SICHE). The Ministry's priority is basic education and the magnitude of the problem precludes financing even that properly. The necessity of finding local solutions to post secondary training becomes important in this context. In addition distance education, properly resourced and organized, could assist in reversing the accelerating trend of an increasing number of school 'push-outs' and drop-outs throughout the education system.

15 The situation in tertiary education is mixed. SICHE does not have a computer lab at present. SICHE suffered greatly during the economic collapse and is now being reviewed for restructuring under an EU-financed programme. The University of the South Pacific (USP) has a Centre in the Solomon Islands, and there are plans to open a campus. USP has identified the need to promote and facilitate more ICT awareness and capacity building for students. The USP Centre is linked to the USPnet satellite system that offers an Internet link, video conferencing and other facilities.

16 Although at present there is very little or nothing at all on ICT in the school curricula, the Ministry of Education and the Curriculum Development Centre (CDC) are pursuing this. The CDC has embarked on a Curriculum Reform Programme which will review and develop primary and secondary school curricula. CDC is studying relevant curriculum documents from other developing countries to help them develop a national school ICT curriculum. A workshop is planned for 2004 on this topic.

17 Schools, even those that have no computers, are expressing a lot of interest in exposing their students to ICT. The CDC believes that Government can be compelled to act on some of their aspirations if CDC can lead the way by introducing an ICT curriculum into the school system.

18 The Solomon Islands ICT Working Group has obtained funding for a Youth Focal Point and Computer Resource Centre, which will target students who need computers to conduct research and to learn how to use the ICT.

19 Although this assessment is too superficial to accurately identify the priorities, it seems apparent that at least the following needs can be stated:

- Formal recognition of the gap in the education curriculum concerning ICT;
- Development of ICT content in the national curricula;
- The Education Ministry should develop an ICT strategy for education;
- Increased computer access for all students;
- Baseline data on ICT penetration in education;
- A physical/virtual access point to facilitate development of ICT in education;
- More official IT support to schools;
- Special attention is needed to connect rural schools to deliver services, provide equipment, IT support and electronic content that can be distributed cost-effectively by CD-ROM.
- Special attention to the needs of senior students hoping to attend university.

Case study: Delivering education services to rural Solomon Islands by email

20 The People First Network with its growing rural network was ideally positioned to pioneer local solutions in distance education. This fact was recognised by USP's Honiara Centre. A project proposal was successfully submitted to the Pan Asia Networking R&D Grants scheme for 2002, administered by the Asia Media Information and Communications Centre (AMOC) and the main sources of funding for the program include UNDP and The International Development Research Centre (IDRC) of Canada.

21 This project was implemented by the Rural Development Volunteers Association (RDVA) in partnership with the USP Honiara Centre from June – October 2002, with PFnet facilitating the networking and providing technical assistance. The project aimed to utilise an existing rural Internet connection to pilot a distance learning facility in a rural community high school. Sasamunga Community High School in Choiseul became the country's first rural community email facility when it opened in October 2001

22 The project entailed the application of a distance-learning programme especially designed to integrate with the PFnet facilities. It also contained a research component that measured awareness of ICT in the community and studied the impacts of the email station. This provided invaluable baseline data for further expansion of PFnet to all rural areas of the country, and an example of an application serving the needs of one information stakeholder group (i.e. education users and providers).

Strategy

23 A computing centre with two laptop computers was opened at the community school close to the email station. Power was made available from the school's own solar supply. 19 students were enrolled into the USP distance-learning program with funding facilitated by the local MP. Over a 2 week period, with backup supervision for a following 6 weeks, all 19 were trained to use the facility for basic office computing and to communicate with USP, sending assignments for marking, receiving counseling, tutorials and advice from the course tutors. For this process, two RDVA volunteers (RDVs) were assigned to the training and supervision of students over the 2 months on site. The RDVs also conducted the research interviews. 10 students were selected to participate in the distance learning trials.

24 USP Centre was the provider and facilitator of the courses for the Distance Learning trials. The courses offered were (a) *Pre -tertiary English* and (b) *English*. The USP resource persons who participated included the (a) Course Facilitator, (b) Marker and (c) Technical Resource Person.

25 PFnet trained these three resource persons at USP Centre to use the PFnet email system, and overcome the limitations of its low-bandwidth and lack of full Internet browsing capability (at the time, the TEK search engine mentioned above was not in use by PFnet). For instance, it was important to prepare materials before transmission by email, to optimize the file size and avoid transmission of unnecessary data. PFnet closely monitored the progress of the students, through reports from the RDV supervisors on site and monitoring reports. A system was agreed which specified a schedule for the communications between tutor, marker and each student. Each student was given an allocation for email use.

Research Component

26 A random sample of 120 villagers was selected for a research interview program. Equal numbers of each age group and gender were included. The main interview concerned experience and the need for distance education, awareness of computers, email, IT training experience and needs, and the use of the PFnet email system with perceived benefits. The exit interview was applied to PFnet email station customers as they exited the facility, and recorded details of their use of the service.

Evaluation of the Distance Learning Trials

27 Evaluation of the pilot was through focus group meetings held by the RDVs with the students and other people involved on site following the completion of the USP course module. This was followed by an evaluation meeting held in Honiara with all project participants present. The

conclusions and recommendations of the evaluation were then presented to an education stakeholders' meeting in Sept 2002, organised by the Ministry of Education.

Evaluation by Participants

28 The detailed evaluation of participants is available in the report to the project's administering body AMIC [10]. In summary, the participants agreed that:

- The utility of the technology was successfully demonstrated;
- Remote learning using ICT produced much improved turn-around times over delivery of courses without the benefit of ICT;
- Participating students' assignment results were in every case well above the average for all distance learning students;
- The pilot should be continued and extended within a national program;
- In delivering education through ICT, it is imperative to train all the participating resource persons;
- The main technological problems that need attention concern the narrow bandwidth of the HF radio system and access to reference material to support the students.

Evaluation by Education stakeholders

29 A workshop on distance education was held on the 24th September 2002 to present and discuss findings and results to all the stakeholders [7]. The workshop was organised on behalf of the Ministry of Education and Human Resource Development. Most stakeholders and donors were represented including the USP Centre, SICHE Distance Education Centre, CDC, the Solomon Islands Association of Rural Training Centres, the Ministry of Education and the Sasamunga Community High School. Development partners included the High Commissions of Britain, New Zealand and Australia, the Embassies of China and Japan, the Resident Delegate of the E.U. and the E.U. Micro-projects Programme, and Oxfam Solomon Islands. The Ministry of Transport, Communication and Works were represented as the lead ministry for ICT policy and strategy.

30 It was noted that the civil unrest and economic crisis had serious negative effects on the ability of the Education Ministry to continue financing overseas post-secondary scholarships and SICHE. The necessity of finding local solutions for post secondary training becomes important in this context. In addition, distance education, if properly resourced and organized, could assist in reversing the accelerating trend of an increasing number of school 'push-outs' and dropouts throughout the educational system.

31 It was agreed that the Solomon Islands Distance Education Network (SIDEN), which involved SICHE and USP Centre and was abandoned in 1999 should be revived using the PFnet technology as a base. For the present, resources would have to come from donors.

32 The distance trial at Sasamunga was judged successful and could be replicated on a national scale provided that sufficient financial and material resources were made available. Given current budget constraints such resources could only come from the donor community. Certain technical limitations of the equipment such as the lack of direct access to Internet will have to be addressed eventually but is anticipated this will be solved as more advanced technology becomes accessible and affordable. It was noted that the turnaround time between student's work and tutor response was cut to days rather than up to six weeks with the former correspondence model. Distance education based upon PFNet Rural Learning Centres should also encompass other media such as video and radio.

33 The Workshop recommended that a *National Coordinating Committee for Distance Education* be established by the Ministry of Education. This would encompass all stakeholders and co-

ordinate the development of a national program for distance education incorporating the needs of school leavers, in service training on a multisectoral basis and collaboration with overseas institutions.

34 The workshop led to PFnet making the following proposals to the Stabex99 Programme Implementation Unit, who are managing EU funds allocated the Ministry of Education:

- To establish Rural Learning Centres in key community high schools in each province. These would build on the model used at Sasamungga in the trials and would involve a small LAN with radio email access, a library, an attached supervisor/trainer and audio and video facilities, with solar power, and will be connected using VSAT technology in partnership with Solomon Telekom;
- To build capacity for communications and networking by the provincial education authorities;
- To create an online presence for the Ministry of Education linked to database management systems and the rural communications network;
- To refurbish the Ministry's databases and linkage to online management systems, with capacity building;
- To eventually establish a sponsorship scheme for distance education and overseas tertiary education in ICT subjects;
- To promote use of ICT in schools through providing computers, competitions and collaborative learning.

35 One year after these proposals were made, the situation in the country has improved following an Australian-led intervention that stabilised the government finances and improved law and order. Under these conditions blocked EU funds allocated to education have been released and will be available from 2004.

36 The MEHRD, together with the E.U. and New Zealand will start implementing an Education Sector Investment and Reform Programme (ESIRP) from 2004. This will be developed and managed by MEHRD with substantial financial and technical input from the development partners. A total of SBD 330 million has been committed for the first three year planning cycle of ESIRP

37 The EU component will include a three-year pilot project to establish provincial school based Distance Learning Centres as described above and to utilize PFNet expertise in developing effective communications for Provincial Education Offices.

38 During 2004 MEHRD will develop a Strategy and Policy for Distance Education in the Solomons that will encompass the Solomon Islands School of Higher Education, USP Honiara Extension Centre and all formal and informal learning networks using appropriate and cost effective technology.

Research Interview Results

39 In summary, the research showed that in the community studied:

- There is a huge demand for formal and non-formal distance education and for ICT training and access to computers and services. 10% of the sample already had some IT skills/experience, and two-thirds of the sample or their family members were using the PFnet services. People of all ages and education backgrounds, but proportionally more well educated and older people, used the services; but overall only 25% of users in the sample were women. People mainly use email to contact family and wantoks, mainly those in the capital Honiara, the nearest provincial

centres and other places of email facilities. They also contact students overseas and long lost family

- People also used email to arrange school fees for themselves and family members. Teachers used it to contact the Ministry of Education and other professional institutions. The distance learning students used it to communicate with tutors and sending assignments. Some people used it to order cargo from suppliers. Several village storeowners now make orders by email. They also used it to order medical supplies.
- The usage data can be compared with the combined data from daily reports sent by the rural email station operators to PFnet headquarters every working day. These cumulative statistics are presented on the projects statistics web page (8) and is upgraded monthly.
- The main perceived benefits of the email facility included providing people with affordable and efficient communications. Many people observed indirect benefits to for example, helping the hospital make orders for drugs and other supplies. People saw the PFnet as a source of information and news as well as a means of communications.
- Respondents stated that the email station has benefited the whole community providing access to current news and information, by reducing the need to travel to town, making it easier to order supplies, drugs and make emergency calls, and by empowering the community to participate in public debates and to influence decision makers.

39 The full data from the research is also available in the AMIC paper [10].

Data on sustainability of the community facilities

40 The research project was carried out in the period June to October 2002. Since that time, the email station usage has continued to grow. PFnet records daily usage data for emails sent from the community email account and other facilities.

Current research program

41 USP (Suva) is currently leading a F\$40K project [9] which takes the described research a step further. Funded by JICA and implemented in partnership with RDVA and UNDP Fiji, the project will conduct in depth research on the impacts of the PFnet email system. The project will study five PFnet email stations with varying characteristics and usage levels, and identify the factors that affect the uptake of services and appropriation by the community. The results of this project will be available in early 2004.

42 The justification for this research is very clear. Now that the PFnet project has facilitated the development of an ICT network in the Solomon Islands, there is a need to examine in detail how PFNet email stations impact on sustainable rural development for poor Solomon Islanders. Pacific Island governments have expressed that equal access and deployment of tele-centers is one of the regional ICT priorities. As such this paper will be a valuable document for all governments and stakeholders seeking to develop policy to improve the livelihoods of people in rural and remote areas in Pacific Island countries.

43 On technical sustainability, PFnet has not suffered any major failure in the 27 months since the first station was established. The system copes well with operators' technical queries through support by voice radio and the network of local technical persons who are involved during deployment.

Conclusion

44 The rural networking project People First Network has demonstrated that new Internet-based technologies can provide efficient means of sustainably connecting remote communities. Recent research has shown that rural communities greatly appreciate the ICT and are feeling the benefits. Further data on the social impacts and factors affecting the uptake and appropriation of the ICT by the rural communities will become available after USP's research programme is completed.

45 The project has also demonstrated to education stakeholders the ability of the network to deliver distance education. The Ministry of Education and Human Resources Development is now embarking on a larger EU-funded pilot to develop e-learning centres in rural areas of each province and introduce ICT more widely within an integrated strategy for education. This is in line with the priorities agreed by the Forum members, which include human resources development through distance learning [12]. Furthermore, the need for more ICT content and access in education has been shown to be central to the development of a national ICT strategy.

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