

# **PAN: An External Review**

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The review team would like to acknowledge the assistance provided by all members of the PAN Program Initiative, who responded promptly and positively to our numerous requests for information. Any errors or shortcomings in the contents of this report are the sole responsibility of the review team.

## **Executive Summary**

This review was designed to provide external comment to the Centre's Board of Governors on the performance of the PAN PI and also to provide input to the PI and to Centre Programs Branch management.

It is the opinion of the review team that the PAN PI has developed a portfolio of projects addressing issues that confront the wider application of Information and Communications Technologies (ICT) to development activities. Our review of a sample of projects supported by the PI, along with a range of other documents related to the work of the PI and the mandate of IDRC, lead us to conclude that the PAN PI has been faithful to the objectives it set for itself in its Prospectus.

We note that the PI has been successful in developing public-private partnerships to support the creation of Internet Service Providers (ISPs) in countries where none existed before. We see these efforts as both innovative and appropriate, and we believe that they may be useful models for other activity areas that the PI may wish to address in future such as content development. The review team sees a particular need for research into innovative models that involve the private and non-governmental sectors and that use ICT to develop and disseminate government sources of information, which we believe are critical to defining and enabling relevant development research.

As the PI has evolved its thinking and gained more experience in seeking ways to ensure that ICT can positively contribute to development, it has started to become more deeply involved in supporting efforts to ensure that ICT reach and benefit isolated communities. We most heartily support PAN's pursuit of these research areas, which will require careful research at the community level of the evolving needs of these communities, the optimal mixture between the new technologies and traditional means of communication, and the measurement of the impacts that such interventions may have. The PI has started to broaden its engagement of stakeholders to accommodate these evolving program interests and these efforts should be continued. We suggest that PAN may wish to consider adding a new cornerstone to its platform of program support — creating the prerequisites needed for ICT applications to work and contribute to development.

Because ICT have great potential to produce impacts, both positive and negative, very quickly on all sectors of society, sharing of information and learning from experiences are critical. We encourage PAN to develop more mechanisms to share complementary experiences among its projects in Latin America and Asia. We also suggest that PAN commission studies to synthesise its learning and publish these results along with final project reports on its websites and through all other means at its disposal.

The review team suggests that the Centre may wish to reassess its exclusion of the Middle East and North Africa from support for projects related to the application of ICT to development. In addition, we encourage PAN to seek additional opportunities to collaborate more with Acacia and Bellanet.

## **Introduction**

This review is one of a series of a dozen reviews of IDRC's Program Initiatives (PIs) commissioned to "provide an independent perspective on specific aspects of the performance of the Centre's work." The review was designed to provide external comment to the Centre's Board of Governors on the performance of the PAN PI and also to provide input to the PI and to Centre Programs Branch management.

The review was undertaken by a team of two consultants who have broad experience both in project and program development and in the evaluation of the application and impact of ICT in development activities. The review was based on the following: (1) an examination of project documents from six PAN projects; (2) materials available on websites of projects supported by the PI; (3) a selection of IDRC documents provided by the Evaluation Unit of IDRC; (4) additional data received from the PI in reply to queries; and (5) discussions with members of the PI team (see Appendix A). The projects reviewed were chosen in consultation with the PI to meet several important criteria: geographic representation of Asia and Latin America and the Caribbean; coverage of multiple project types as defined by the PI (e.g., infrastructure, content, collaborative delivery, and global coverage); and representation of various team members.

## **PAN**

PAN (Pan-Asia Networking) was originally conceived in Asia in 1994 in response to needs expressed by research and policy institutions in that region. Following regional consultations, a program was defined to work in four areas: connectivity infrastructure; content development; communication and networking; and collaborative research on ICT and policies. When PAN was reconstituted as a PI in 1997, these four areas remained the focal points for the program, which was expanded to include Latin America and the Caribbean as well as global-level activities. A decision was made not to consider or support regional or national activities specific to North Africa and the Middle East and Sub-Saharan Africa due to limited resources and the fact that Acacia was IDRC's mode of program delivery for ICT research in sub-Saharan Africa.

The mission of the PAN PI is to establish efficient communication and net working among developing-country research and development institutions, NGOs, and development workers with the aim of supporting their efforts to solve development problems. The overall objective of the PI is to determine how researchers and development workers in developing countries can best use, develop, and adapt ICT to increase the impact of their research to solve development problems — social, economic, cultural, political, educational, or environmental.

## **Organisation of Report**

This report addresses all of the issues that were specified in the terms of reference for this review. The evaluators' findings are reported under **Results**. The final sections present the **Conclusions** and **Recommendations** flowing out of the review.

## **Results**

## Relevance of Research Approach

Since its inception in 1994, PAN has been developed in direct response to needs expressed among its principle recipients. The PI has continued this consultative process to define program directions and move the program toward application of ICT to development needs. For example, the PAN Partners meeting held in Mongolia in 1997 brought together a wide range of stakeholders. It was used to define regional priorities, to experiment with simultaneous electronic conferencing, and to constitute a Steering Committee to guide future research that might be supported through a small-grants program on ICT applications and policy. A similar consultative process was used in Latin America and the Caribbean (LAC) to define regional priorities and the role that PAN might play. Once again, PAN used this activity as a forum for experimentation. An electronic or “virtual” conference was organised in advance of the face-to-face meeting and valuable lessons were learned about trying to orchestrate such efforts (see *Montevideo Conference Follow Up*, Scott Tiffin, 22 May 1998).

These consultations, combined with the experiences of the PAN PI staff have, in the opinion of the review team, led to the development of a research approach that is in harmony with the major issues faced in the application of ICT to development activities. Among these issues are broader access to electronic communications, content development for Internet sites, sustainability of ISPs, electronic commerce for small enterprises, Internet policy, technology adoption for developing countries, and research into the information needs of rural communities and the impact of ICT on these communities.

## Concerns

The review team has confidence that the PAN program is relevant to current concerns over Internet access and its use and application to research and development communities. However, we see a significant difference between the needs of the “development research” community and communities at large. In our view, development is a continuum that spans research, development, pilot implementations, and large-scale deployment, and whose results are achieved only with the latter.

We support PAN’s concern with extending access and use of ICT to a much wider range of users, but emphasise that ICT tools are just part of the communication process, especially at the community level. The delivery mechanism in this process does not need to be technologically monolithic, but should encompass hybrid solutions that combine ICT with more traditional delivery methods.

Some changes will be required in future to achieve PAN’s goals. As PAN works with its partners to affect change at the community level, it will need to expand its interactions with key intermediaries. The research projects supported to date in Latin America and some of the proposals for small-grants in Asia are starting to address the extra complexity that this will bring to PAN projects. As these projects accumulate experience, it will be crucial for PAN to ensure that produced results and lessons learned are shared not only among PAN partners in both Latin

America and the Caribbean and in Asia, but also with the broader development community. In this regard, PAN should continue to collaborate with Bellanet [through such learning-related activities as Learning for Development in the Information Age (LDIA) and Learning About ICTs for Development (and LID)] to ensure that lessons related to ICT activities are documented and shared. There may also be scope for greater collaboration and sharing with Acacia in future.

It is crucial that work on community access and distance education be done in close collaboration with cooperatives and local community organisations to mediate access to information — this may require that PAN institutes more formal links with other PIs. Close attention to community needs and appropriately targeted information services and products (tailored to needs of users) are crucial if local communities are to benefit from ICT — this means research is required to identify these needs and should be a precondition for interventions by ICT. Some LAC projects show promising beginnings in that direction that should be extended systematically to Asian projects.

Global privatisation trends and the entrance of multinational players to the ISP market of developing countries, lead to increased competition, and after a transition period that can be several years long, to lower more affordable prices for electronic communications. PAN should give some thought to how to provide universal access during the transition period until prices reach a level affordable for large layers of the population, not just the upper and middle classes. There are a few prototype solutions from other countries that need to be considered and possibly adapted and applied to the PAN countries. One model imposes “universal access duties” on large private operators (both foreign and national) as an integral part of their operating licenses in return for the concession of the lucrative regions or market segments [South Africa]. Another model mandates a public-sector agency with providing affordable (subsidised) universal access for the “sectors of public concern” until access becomes affordable for these sectors [Jordan]. Most of these solutions, if not all, require governments to address telecommunications policy issues as an integral part of an overall national information policy that is linked to development priorities.

The review team has some concern over the need to limit activities in Sub-Saharan Africa and Middle East and North Africa. Although a lack of resources has limited PAN’s ability to work in these areas, needs for assistance, in particular in Africa, are high. There have been many innovative ICT projects conducted in this region that could enrich PAN’s knowledge. If this geographic limitation on PAN is to be continued, IDRC must ensure that “real” collaboration and sharing of information and lessons occurs with Acacia. The exclusion of the Middle East and North Africa is more surprising given that no IDRC ICT program covers this area of 240 million people, which still faces tremendous development challenges.

Although at a professional level the review team feels there has been sharing among the PI staff members of PAN and Acacia, we wonder if sufficient learning is being transferred between the two initiatives. It is also important that the projects that the PAN PI has supported in Asia and in LAC should benefit from each other’s experiences as they are addressing problems of mutual significance. For example, PAN Asia is exploring new technologies that may reduce the entry

threshold of the target communities to ICT applications, a stated objective of several LAC projects. The projects in LAC have, on the other hand, made significant strides in the methodology of researching communities needs and in establishing measurement mechanisms for outcomes.

As PAN continues its efforts to increase the impact that ICT have on development, it should look for opportunities to enhance interactions with other PIs within the Centre. Within the limited number of projects we reviewed, we found little evidence of cross-pollination among Centre PIs, and greater interactions with non-ICT PIs (such as SME) might be interesting and useful. The proposed further involvement of the PI in such areas as distance education and telemedicine certainly suggests the need for collaboration both on methodologies and content but also to deal with such issues as the ethics of medical research.

### **Relevance to Prospectus**

The team reviewed six projects (as well as supplements and associated projects) to determine if the activities supported by PAN were relevant to the objectives stated in the PI prospectus. PAN Mongolia (94-8008) is a “model” for the other ISPs that were supported and reflects the importance of government policy support for the introduction and expansion of Internet services. It is noteworthy, that PAN’s remarkable successes in Mongolia were achieved after the Mongolian government in 1992 required government-supported organisations to become privatised and self-financing. Government staff working in such institutions were allowed to buy and own shares in the company in which they worked. Datacom, PAN’s partner in Mongolia, was such a company. Without this important policy decision, Datacom would have had many more obstacles to surmount before succeeding. The team feels that scheduling of policy related activities only for the third year of the initiative indicates not only lack of appropriate resources, but also that the integral role of policy in harnessing ICT for development may not have been given the priority it deserves. The review team supports the PI’s plan to expand staff resources in this direction.

PAN Mongolia also illustrates the value of sustained IDRC support. Development time spans do not necessarily match the time frames set by a project or a PI. If support is terminated before the natural development cycle is completed most investments are lost. Once the basic infrastructure and skills were in place, DataCom could move to undertake experiments in local community access and also to investigate innovative ways to create links with rural communities leveraging these infrastructure and skills (03810). PAN also helped created international credibility for the project by hosting a PAN conference in Mongolia. This helped to showcase achievements and to show what was possible with limited inputs under favourable conditions. The Mongolia project has progressed to the point where the external evaluator who conducted the ISP evaluation recognised that DataCom staff could be valuable resource persons within the region.

The research and development small-grants project in Asia (40400 and 03820), originally administered by IDRC is now handled by Canadian Centre for Occupational Health and Safety (CCOHS) in Hamilton. Although, this appears to be an unusual partnership, administratively the

project looks to be successful. The team would have preferred to see this project administered by an institution in Asia with ties to research and use of ICT in the region; however, the panel of experts that makes funding decisions is from Asia. Small grants have been used to support projects in distance education in China, Indonesia, and India. These projects explored the use of Internet for distance learning by nurses (China), agricultural workers in national agricultural systems (India), and general education (Indonesia). An innovative project in Bangladesh funds computers and Internet access for schools by reforestation of barren lands. PAN's positive experiences with the small-grant program in Asia are being adapted for LAC with a project at the Facultad Latinoamericana de Ciencias Sociales (FLACSO) in Ecuador.

PAN's support to strengthen networks of researchers on ICT in LAC is an interesting approach to developing regional cooperation. This project explicitly separates contents and methods — it aims to create an information resource based on the shared experiences of network members who are working on issues related to the impact of ICT on society. The methods to be explored include experimentation with, and use of, electronic means to participate in meetings and conferences — to create “virtual communities” in the region. The review team feels that the efforts the project is making to advance methodologies for encouraging electronic discussions, the use of automated translation of discussions, the establishment of an electronic clearinghouse of resources, and efforts to measure the impact of ICT in community development work are very encouraging.

The PAN Asia Networking – Philippines (PINS) (04320) project is a good example of the catalytic role PAN is playing in advancing the institutions of the region toward the goals stated in the prospectus. Support was provided to Department of Science and Technology (DOST) to acquire, host, and administer the PINS server, as well as to Approtech Asia to enhance its content development and publishing capabilities and those of other institutions. The project also strengthened cooperation modalities between various organisations within and outside the Philippines. Today, the PINS server hosts the websites of six other organisations and has links to many more. Although the team had difficulties accessing the PINS site, it was possible to access the information through the Pan Asia site. A sampling of the underlying websites (Approtech Asia) showed that some of these provided links that were surprisingly rich in information on all aspects of government and development in the Philippines down to the full text of some important legislation. Others had less depth and coverage but provided information on their organisation, mandate, program, and teams as well as contact information. The review team believes this project demonstrates the value of applying support to encourage different organisations to develop more synergetic cooperation that could continue beyond the project. The results fit well with the stated goals of the PI.

The Community Networks Pilot projects in Latin America (03219) recognises perfectly the main obstacles to a wider use of ICT in development and is strongly oriented on users needs. While it plans to evaluate telecenter concepts (Neighbourhood Information Units) and related radio technologies, it clearly recognises the importance of policy, aims at developing socially relevant applications, and takes a holistic approach. It stands out in that it addresses the research tools needed for measuring and assessing the outcomes of the project right from the beginning. Although the project documents reviewed do not address transfer of results outside the LAC



region, the methodology of assessing community needs and designing such tools as an integral part of the project could help PAN Asia projects substantially in documenting and analysing their achievements. On the other hand, the results of wireless technology assessments carried out in Asia would be of great interest to this project. This underlines the need for PAN to adopt a larger strategic ICT framework to unify the activities in the two regions and to coordinate their needs and their outcomes (and perhaps for IDRC to do so in all regions).

The Virtual Business Corridor project (50300) leverages the TechnoGate tool developed by the Canadian Advanced Technology Association (CATA) for enabling exchange of business information (e.g., company profiles, products and services information, and human resources information). Partners (mostly associations similar to CATA in their countries) are identified, signed up, and provided with the tool needed to post their own “client” companies’ information. The use of TechnoGate by the partner association and the end users requires payment of various fees, some of which seem high for small and medium businesses. There are no provisions for a free trial period to familiarise the end-user companies with the tool and allow them to make an informed decision. The review team was able to explore only the “Guest” portion of the sites, not the password-protected portion for subscribed members. The information accessible in this mode on the Chile and Uruguay partner sites was generally useful but lacked depth. One site linked to information provided by Canada’s Department of Foreign Affairs and International Trade (DFAIT) and the local Canadian embassy. No links were provided, however, with other public business-related sites such as Industry Canada’s Strategis system.

While the fee-based approach is understandable from a “sustainability” angle, the team feels that the underlying e-commerce concepts are still very new. There is no doubt about the strategic importance of e-commerce in the next few years. However, substantial research is needed on what kind of organisations can and will use this particular tool, and for which specific needs. The classifications in the TechnoGate application seem to be aimed at larger enterprises (e.g., aerospace, defence, and mining) and the tool may need adaptation to the smaller firm size of developing countries. In the opinion of the team, such research cannot be easily carried out in a closed “for-fee” environment. A methodology for monitoring the project’s progress and assessing outcomes must be established at the beginning of the project if the results are to have significance in a development context.

Our review of this limited number of PAN projects, coupled with an examination of projects in the “pipeline”, leads us to conclude that the PI has developed a portfolio of projects that are well conceived to help PAN achieve its objectives as stated in its prospectus.

## **Engagement of Researchers and Stakeholders**

From the beginning, PAN has tried to secure participation by researchers and other stakeholders in its activities. These efforts started with meetings to identify regional program priorities. After these initial consultations, the PI recognised that it must broaden its range of stakeholders. In fact, the PI is an interesting model of how to engage the non-governmental and private sectors in efforts to ensure that research investments lead to large-scale deployment of results and in this

way contribute significantly to positive and sustainable development.

The PI initially worked with research and policy institutions to define their needs; however, it soon expanded stakeholder involvement to include potential commercial partners. As research is conducted in community-level use of ICT and distance education, the PI must continue to engage a much broader range of stakeholders (e.g., specialists in rural development, rural communities and their leaders, and technical intermediaries who can facilitate the installation and use of ICT in these settings).

The government, particularly in countries where it plays a dominant and controlling role, must be considered a primary stakeholder. Government usually controls a large portion of the information collecting and processing structures of the country, as well as most of the information needed by researchers and development workers to carry out locally significant research. Governments also possess (even in the least developed countries) significant resources that can be directed toward development. Finally, even when other stakeholders have been engaged and achieved some success, the government can still be a major obstacle to further progress through a simple directive or legislation. It is, therefore, essential to engage governments at multiple levels and to maintain a dialogue with decision-makers.

Research is usually not the top priority of the governments of developing countries. Survival and day-to-day management of the country are the number one priorities for the government. But, these two tasks, which are essential prerequisites for an enabling research environment, require tremendous amounts of data, information, and knowledge to be produced, processed, distributed, and consumed. The unlocking of this information requires more research to determine how ICT can bring noticeable improvement to these tasks and the efficiency with which they are carried out. New innovative models involving the private and non-governmental sector, and sensitive to government constraints, are needed for the development and dissemination of government information.

The development process can benefit significantly if an indigenous capacity exists to articulate the information needs of the various economic and social sectors of the country, formulate strategies for responding to these needs according to development priorities, translate strategies into action plans, and to monitor outcomes. This process can leverage the significant investments made by countries in ICT because it links these more directly to development priorities.

PAN must continue to seek full engagement of policy-makers. PAN engaged policy-makers in the discussions leading to the development of ISPs in countries where none existed in the past. There is a need for a broader engagement of the PI in research on policy issues to remove obstacles to the application of ICT and to use these to unlock government information. This need has been expressed in PAN-supported meetings (such as PAN Mongolia) but has been slow to develop partly because PAN lacked staff resources with specific expertise in policy research. The addition of a new program officer later this year should help this situation.

The PI must extend its efforts to help organisations ask questions about the content of their websites and to determine what information users of these sites are looking for. Initially the sites are seen as a way to introduce the “world” to the institution; however, to make the Internet more relevant to the needs of their users, the organisations must determine what their audiences want and need and tailor their information products to their clients. This is analogous to doing market research for any new product, and it will become increasingly important if the sites are to remain relevant to their target communities or be used in conjunction with e-commerce.

PAN may also wish to engage its partners to examine how Intranet technologies can be used in large organisations and government structures to achieve good governance through better coordination and sharing of information. These efforts could be developed hand-in-hand with initiatives that seek to make such information available to broader public audiences.

Overall, the review team is satisfied that PAN has, to date, adequately engaged its primary stakeholders. However, as the PI further evolves, it must ensure that there is adequate content development, real use of ICT technologies to network and share ideas in a virtual workspace, and expanded use of ICT and related applications in non-research communities.

## **Relevance, Quality, and Nature of Results Achieved**

This section reviews the outputs that have been generated by the PI, the people and groups that have been affected, and the changes that have occurred due to the activities of the PI. In general, the results have been achieved in a timely way, and in some cases the progress achieved (for example, the PAN Mongolia series of projects) has been quite remarkable.

### **Outputs**

PAN-supported connectivity projects led directly to the creation of ISPs in Bhutan, Cambodia, Laos, Mongolia, Sri Lanka, and Vietnam. In 4 of these 6 countries, these ISPs were the first to provide a relatively stable Internet access in the countries. The latest to achieve access was Bhutan, which joined the Internet community on 1 June 1999. This series of projects was the subject of an earlier PAN evaluation (*A Report on PAN-Supported Internet Service Providers*, Carlos A. Afonso, February 1999).

In connection with these ISP projects, PAN has also funded public access centres to provide both training and subsidised Internet and email facilities to urban users. More recently, PAN has sought to further extend access to ICT to smaller communities and remote areas. The PI has supported several projects that include innovative experiments in Mongolia, Pakistan, Ecuador, and Colombia. These projects are experimenting with wireless approaches to expanding Internet access that range from the use of radio modems to satellite broadcasting of web pages as part of television signals. In India, PAN support to the Swaminathan Research Foundation is helping to define information needs in five villages in the Pondicherry region and to determine the impact of ICT interventions.

A second area of outputs for PAN relates to the development of appropriate content that can be accessed by the new communications channels that have been created. These outputs have related mostly to the training of individuals in the creation of websites and subsequent assistance to launch the sites that are created. This support has been provided in both Asia and Latin America and the Caribbean. The first of these content-development projects was established with the Philippines Department of Science and Technology. Other such projects have helped establish a national Intranet in Vietnam to allow research institutions to publish research results on the web and helped created an electronic network for sustainable mountain development in Nepal. Many PAN projects have also provided training in the technical aspects of networking to ensure that local capabilities are created to maintain these facilities and solve problems that arise during project implementation.

To support its efforts related to website development and to encourage wider networking among research and development organisations, PAN established a PAN Asia website. This site focuses on Asian activities of the PAN initiative and provides, as necessary, web hosting for partners that require these services and mirroring of nationally housed sites that are less accessible because national telecommunications infrastructures do not provide sufficient capacity. This website also provides an opportunity for PAN to test tools for electronic conferences and listservs, and to investigate expanded uses of the Internet for electronic commerce and distance education. As such it is an important tool for keeping IDRC and PAN staff up to date on the rapidly evolving ICT. In addition to this site there is a “corporate” PAN site maintained within IDRC’s main website in Ottawa, which provides a more global view of PAN, integrates the PAN initiative with other IDRC programs, and provides a temporary gateway to PAN activities in the LAC region. Together with a range of well-designed print materials, these sites provide a public relations component for the PI and IDRC. Visibility is important to attract both more partners and other donors.

Unganisha (an internal IDRC project) was also supported through PAN. This project sought to extend the Centre’s connectivity to its projects and facilitate collaboration between projects, between IDRC program initiatives (PIs) and program officers, and between different groups within the Centre. Although this project functioned as an independent activity it does represent an important output of PAN. (A separate review of Unganisha was recently undertaken. See *Unganisha: An Assessment of Results and Effectiveness*, Michael Graham, June 1999.)

PAN has as well been able to train a cadre of individuals in both the hardware required to establish computer networks and Internet access, and in the software skills necessary to send and receive email and attachments as well as to create websites. This training has taken place through workshops organised by PAN as well as within-project training. The review team focused on determining what types of training were provided and the impact that such training had on project activities. Local consultants were used to provide training in most cases, and PAN was careful to ensure that ISPs, for example, not only learned how to install servers and create the physical connections but also how to manage the “business” aspects running an ISP. Similarly, in Latin America, training of ISP staff was organised in collaboration with other ISPs in the region.

On our behalf, PAN used one of its mailing lists to conduct a rapid survey of training opportunities provided by the PI. Over a 3-day period, an impressive array of training and an evident “multiplier” effect were reported. Responses were received from 17 PAN partners who reported that more than 70 project staff had been trained through PAN support and that, subsequently, these people had provided training to more than 750 others. Training sessions were also provided in Singapore and made use of the PAN Asia site. The success of the ISP ventures and the number of new web sites created by PAN partners attest to the success of these training activities. The training activities are continuing. A training workshop in e-commerce is scheduled for 16–19 August 1999 in Singapore. This training is addressing an important aspect of extended Internet use and one that may help these institutions make their Internet activities self-sustaining. This knowledge transfer is an important although less visible outcome of PAN.

A by-product of the above training survey was that most projects responding indicated in one way or another that they would welcome more frequent contacts with PAN staff. The reviewers feel that in planning for the next phase of the PI consideration should be given (both in the budget and in the load assigned to staff) to a more continuous contact with the projects. Such contacts are often a turning point or a catalyst for local discussions and ideas regarding ICT for development.

PAN has continued to evaluate the results of its projects. Earlier studies have been commissioned to understand how ICT are being used within the PAN network (*The Pan Asian Networking Project: A Survey of Communications Activities*, Michael Graham, 1997) and to evaluate the work supported under the ISP program (*A Report on PAN-Supported Internet Service Providers*, Carlos A. Afonso, February 1999). Because the current study was designed to review the program, rather than individual projects, the reviewers are not in a position to comment in detail about the full range of outputs of the PI. However, in the course of the review we did examine a number of project reports and visited approximately 40 web sites created or made more accessible with PI support. In our judgement, these outputs are of good quality and indicate that these institutions are capable of further developing their content in a professional manner.

We would like to encourage PAN, however, to work with its partners to ensure that outputs in the form of “results” and “lessons” rather than project “descriptions” are posted to websites. The majority of the websites linked to the PAN website present general information about the institution and sometimes some listing of projects that have been supported. Only a limited number present much in the way of results and lessons that transcend the projects that have been supported. PAN should continue its efforts to encourage its partners to share their results. In this regard, the Computerised Library and Information Clearinghouse (CLIC) established by the National Institute of Rural Development in India is a good example. PAN could also use its own web presence to present more information on “results” by creating links to final project reports. In addition, PAN should ensure that the lessons learned from the activities and the projects it supports are appropriately synthesised and shared on its websites.

The review team believes that the evaluation of outputs should not limit itself to the assessment of the technologies themselves but rather seek to measure their impact through some economic and

social indicators. This is an important area of research that should be considered by the PI. For example, it would be useful to have tangible evidence of changes brought about by the introduction of ISPs beyond number of users and hits on websites. In this context, evidence should be more systematically collected on new collaboration in research among countries or among different organisations within the country; new businesses being created using the newly available Internet access; and research undertaken as a direct result of issues raised in discussion groups or electronic conferences. It would also be useful to summarise some of the obstacles encountered in this regard as a step toward formulating directions for future research. Experience gathered so far on establishing and orchestrating electronic conferences on the PAN Asia site should also be publicised. As PAN invests in synthesising its experiences to date, it should continue its efforts to publish its findings both through its websites, through web casting, and through other more conventional media such as journals, magazines, radio, and television.

Our review of the outputs achieved to date recognises that in some ways the PI has developed its approach in a sequential fashion: connectivity, then content, then communications, then research. Ideally, it would have been desirable to have this approach better integrated across the four cornerstones of the PI by applying support in all four areas in parallel. Practically, however, such integration in the early stages of the PI was likely not feasible because fundamental technical capabilities had to be established before issues related to content, networking, and research could be addressed. Now that the groundwork has been established, a more integrated approach should be pursued. An additional cornerstone should perhaps be considered that deals with creating the optimal conditions needed for the introduced ICT applications to work and contribute to development. The team recognises, however, that such an approach may be constrained in certain countries through the limited capacities of the recipients that are supported.

## **Reach**

PAN (particularly in Asia) has had an influence at multiple levels: individual joint ventures, communications activities of research and development organisations, NGOs, private sector, and government. As a result, it has made a difference at both the regional and national levels.

The projects supported by PAN brought, for the first time, Internet services to four countries in Asia. The ISPs that were supported through the connectivity activities of the PI have now become self-sustaining, which suggests that their clientele has grown and that access to ICT-based communications is expanding in each of these countries. Although these clients can be expected to be the more wealthy members of these societies, the reach that the PI has had on such a national scale cannot be discounted. PAN now counts among its clients: government agencies, non-governmental organisations (NGOs), universities, research institutions, researchers, academics, decision and policy-makers, development workers, the public interested in Asian development issues, telecommunications policy-makers, networking experts, generators of Web information, Internet service providers, and Internet users. Such a wide reach creates a “desirability” for applications and products based on ICT, which enhances demand, and thus creates more opportunities for local entrepreneurs to cater to that demand.

The PI has also helped instil a business-like approach to its projects by developing joint-venture style projects with its recipients. These projects were, from the beginning, seen as businesses that should be run in such a way that they could cover their costs. This departure from a “grant-based” modality was appropriate because regeneration or recovery of grants is one way to insure long-term development investments in the face of dwindling aid budgets. Coming from a tradition where “business” and “profit” had strong negative connotation, it was also innovative and courageous. PAN developed initially this project modality to eventually recoup all or part of IDRC’s investment in ISPs. Although the ISPs have survived and proven themselves sustainable, IDRC has not yet succeeded in adapting its own policies and procedures for dealing with such ventures. In some cases, the loans consequently have been turned into grants, which certainly casts some doubt on the credibility of IDRC when negotiating similar arrangements in the future. This suggests a need for IDRC to resolve its policies to support rather than hinder such an innovative project modality. Although PAN in future may support few ISP projects, we believe this modality could be used to develop other projects, including the production of content and added value. The private sector may be interested in taking government information and investing in adding value and accessibility to make it more useful to a broad variety of users. The same innovation may be possible in terms of making information from research and development organisations more easily accessible and more widely available. The review team believes that research into how to encourage and sustain such public-private partnerships to add value and provide access to this information, is critical to development efforts, and should be considered by PAN.

In conjunction with the development of physical infrastructure, PAN has helped (directly and indirectly) more than 100 research and development organisations fundamentally change their approach to communications. In the earlier study by Graham, all of the PAN partners that were surveyed used email for regular communication and at that time (mid-1997), 87% had full access to the Internet. This development has allowed for easier communication among partners and has started to increase the sharing of information. At the time of the earlier study, little collaborative work had been undertaken as a result of the introduction of ICT. Although evidence of direct collaboration is still difficult to obtain, the impressive array of websites linked to the main PAN Asia website is a testament to the evolution that has taken place within these institutions. Given the fact that the Internet did not exist 2 years ago in some of these countries, the existence of a web presence is encouraging. It should also be noted that information on developing countries is often lacking in libraries (in both the North and South), and the availability of web-based resources represents a totally new information source for researchers and development workers. PAN is also continuing to experiment with the use of electronic conferences and listservs, both in its own project and program development work and to allow its partners to experiment with these tools to advance their own thinking about topics of mutual interest. More work on the use of these “interactive” tools and how they can be applied to development work should be encouraged.

PAN continues to develop projects that will move this access out from the capital cities to smaller urban areas and to rural communities. Work in Asia and in Latin America and the Caribbean is seeking to extend the use of the Internet through telecentres and other approaches to providing

access in remote areas not serviced by regular telephone lines. Radio modems and television broadcast signals are but two of these means. The efforts of the PI to integrate ICT with more traditional media through the use of intermediaries are strongly endorsed by the review team. As these studies are completed, PAN should ensure that evidence of the changes that are occurring due to the technology introductions is collected and shared broadly. The inclusion of free public access centres as part of the ISP projects PAN has supported has also opened access to a range of users that has included school children as well as members of the general public. In Cambodia, although the access centre is open 7 days a week from 8 am to 6 pm, demand for computer time is reported to outstrip availability. The manager of this centre was quoted in a PAN report as saying that researchers are using the facilities on a regular basis. One would expect that this raising of awareness in the research community could lead to greater demands by these individuals to have these facilities where they work and live.

PAN has also started to explore with its partners the use of the Internet to generate additional sources of revenue. These efforts originally started with advertising of publications and the posting of simple order forms. For example, the Asian and Pacific Coconut Community (APCC) in Indonesia generated about USD10,000 (about 30% of total sales) through Internet-based sales although the server was not yet secure. The orders came from many locations including the United States and Latin American countries, which documents the far reach of this particular site, and the potential for other similar activities. PAN Asia is moving forward with plans to develop an e-commerce site to further explore this method of generating revenue.

PAN has had success in encouraging other donors to collaborate in its projects and to provide funds in conjunction with PAN projects. In Latin America and the Caribbean, the private Swiss foundation FPH is collaborating on a project to Strengthen Networks of Researchers on Information and Communications Technologies in Latin America and the Caribbean. PAN is working with the International Fund for Agricultural Development (IFAD) to develop its Electronic Networking of Rural Asia/Pacific Projects (ENRAP). The Government of Singapore provided substantial resources to help further development of the PAN Asia website. Continuation of the PI's work in Mongolia was assisted by the National Science Foundation in the United States, which provided a leased line for faster external Internet connectivity. NORAD has also provide funding for the PAN Lanka project and Technical Co-operation among Developing Countries (TCDC) funding from UNDP was provided to a project to establish e-mail connectivity, web presence, and Internet networking for national focal points of the United Nations special unit for technical cooperation. CIDA also contributed to a pilot project on providing internet services in northern areas of Pakistan.

The dominant modality was "post-funding" rather than co-funding. This confirms the pioneering role of the PI (and indeed of IDRC) in opening new development paths and exploring uncharted territories. Such pioneering is always accompanied by risks but is indispensable for progress. The evaluation team endorses the pioneering efforts of the PI without reservation.

## **Impact**



It is difficult in a program review to be able to *measure* the impact that PAN and the ICT it has introduced have made. In fact, measuring the impact of ICT is an area of research that still requires a considerable amount of work. However, the fact that the PAN Asia website has attracted up to 300,000 “hits” per month is quite remarkable for a development-oriented site. In April 1999, there were 260,290 hits and 22,183 user sessions. As it is the case for most web sites, a large portion of the users are from the United States with 10,926 user sessions in the period as compared with 758 from Canada. The high numbers from the United States may be partially explained by the fact that most web indexing engines are domiciled in this country. The site also registered access by users from other developing Asian countries for April 1999 as follows: India (114); Thailand (133); Nepal (159); Indonesia (93); Hong Kong (84); Philippines (30); South Korea (17); China (15); Taiwan (14); Pakistan (10). Less than ten users each for the month came from Sri Lanka, Brunei, PNG, Cambodia, Maldives, and Mongolia. While these numbers are still relatively low they do indicate an increased interest in information and research results of other countries in the region. Two additional factors provide a multiplier effect for the impact: most of the Internet users in the Asia and LAC regions are “institutional” users, so use extends to many individuals; and the users (both institutional and individual) have generally a higher position in the hierarchy of decision making in those countries.

Evidence is lacking of positive outcomes as a *direct* result of PAN’s efforts. Such evidence includes collaborative research inspired by the links, joint publishing ventures from people “meeting” on the site, application or adaptation of results from one country into another, changes in policy as a result of list discussions or electronic conferences, or indications that policy-makers are now monitoring or participating in discussions. Evidence is lacking because no monitoring and acquisition mechanisms for such specific evidence were built into the PI action plan from the outset. To be fair, it is difficult to search for this information in retrospect. The review team suggests that it would be worthwhile for PAN to research such important but indirect outcomes.

Clearly, more information can now be located though PAN-supported websites and access to the Internet at large by researchers and development workers in countries where these ICT resources were previously unavailable. In some cases, this information was difficult to access in the past because several of the countries where ISPs were created had official policies that closely controlled information resources. The ISP projects are slowly starting to change this situation. The review team believes PAN should continue its efforts to encourage and support even greater liberalisation of information flows. Access to government information resources as well as the resources found within research and development organisations continue to be important. We suggest that there may be scope for research into mechanisms for public-private cooperation supporting these developments as well as in connection with efforts to develop e-commerce.

PAN has used regional consultants as much as possible to assist the projects it has funded. This South-South collaboration is very much in line with IDRC’s philosophy and should continue to be encouraged. For example, a team of specialists from an ISP in Nepal was used to help with the installation in Bhutan and to transfer know-how to staff, and the consultant who undertook the ISP evaluation in Asia was from Latin America. Such efforts should be encouraged and expanded

to other areas such as collaboration for developing content. At the same time, obstacles for much larger cooperation between the partners of PAN among themselves with less support from donor organisations should be explored and action plans to assist in removing such obstacles specifically in the ICT-related organisations should be developed.

### **Sustainability**

With regard to other forms of partnership, PAN has experimented with several private-sector partnerships. These partnerships have involved recoverable loans as well as equity positions in companies. PAN has identified two different ways in which such partnerships can work. In the first scenario, the public partner should ensure that its objectives are built into the company and then step back and allow the private-sector partner to manage the activity. The second scenario would see the public partner retain control of the business to protect its development objectives. According to a review recently conducted by a PAN intern, the first option appears to be less time consuming to develop and because the business expertise is in the commercial partner (and is not usually present at the same level in the public partner). At the same time, there is a need for IDRC to adapt its own rules to enable innovative public-private solutions. Although there are risks associated with revenue-generating activities, if these activities are linked to a development agenda, this represents nothing more than the traditional cross-subsidies that exist in a number of countries and sectors across the world (including the industrialised ones). For example, the entire North American telecommunications deployment and high-rates of telephone penetration were all achieved under a regulated monopoly (Bell) using cross-subsidies that channelled profits from long-distance calls to non-profitable local telephone services.

The ISPs that were supported by PAN in Asia, although they have still a fairly low subscription base, are now sustainable on the basis of the revenue they are generating. As more commercial ISPs enter the marketplace, competition should further reduce the cost of access and the market should continue to expand. Efforts may still be needed to support NGO-type ISPs that exist for the “public good,” and a global PAN-supported study on Strengthening NGO ISPs is examining such issues. In the long-term it will be interesting to watch how these non-commercial ISPs evolve. In the short to medium term, however, they must continue to be supported within the context of protecting the universal access rights of the “sectors of public concern”.

Once organisations and individuals adopt the use of ICT for their core tasks, these Internet-related skills are likely to be sustainable because the costs of communication are generally perceived to be offset through gains in efficiency and productivity. ICT applications are new, but brief experience with these technologies suggests that once a minimum critical mass is reached they are quite resilient to changes in political structures and to reasonable amounts of economic duress. As usual, the challenge is in quantifying the returns (which are usually indirect in nature) on investments (which are usually direct costs) and in achieving the full potential of productivity and efficiency that becomes accessible to the organisation as they adopt ICT.

The PI is also now faced with important questions with respect to the sustainability of the PAN Asia website. The PI has stated in its most recent annual report that it is considering looking for

other mechanisms with which to operate the site. Given the criteria that have been applied to PAN's support for ISPs it seems reasonable that the PAN site should look for ways to generate revenue to sustain itself. Although this might mean that a consortium of donors would come together to lessen the financial costs to IDRC, this would hardly constitute a commercial operation. It would be an interesting experiment in the generation of economic activity to see if the site has generated enough interest to be truly self-sustaining. Even if the site is continued in a subsidised way in order to support new non-profit segments of its constituency, some consideration might be given to placing limits on how long it acts as a host for other institution's websites. This would allow the site to remain at the same overall size because as new partners receive assistance with the establishment of a web presence those who have been hosted for a predetermined time would be "forced" to seek other hosting arrangements. PAN might also find that the need for direct assistance will decrease with time as the Internet continues its "natural growth" in Asia. PAN should also be sure that it does not create a dependency on its facilities and resources that limits innovation and creativity in finding local solutions and instead fosters taking the "easy" route of having PAN host and manage web resources for others. PAN and IDRC should ensure that they do not create a situation that is very difficult to withdraw from in future.

## Conclusions

- ▶ PAN was developed in direct response to user needs and has made a very positive contribution to experimentation and adoption of ICT for development purposes. Some of the results achieved by the PI have been remarkable. The review team is particularly encouraged by the fact that the PI has been able to link research with the deployment of results for development purposes.
- ▶ PAN (particularly in Asia) has had an influence on a wide range of stakeholders in the target countries and communities. As a result it has made a difference at both the regional and national levels in regards to access of users to Internet technologies and the availability of local information resources on the Internet.
- ▶ The PI has contributed to IDRC's international reputation in the use of ICT for development purposes. Its pioneering efforts have been able to attract contributions from other donors to complement and support PI projects. The PAN Asia website, as well as the central PAN site in Ottawa, are important components of public awareness as well as important venues for experimentation.
- ▶ The evolution in the PI's program modality from establishment of ISPs to funding research to support community uses of ICT is appropriate and reflects the change in the environment for ICT since 1994.
- ▶ The PAN PI is correct in seeking to broaden its interactions with institutions and groups involved with community work. The review team sees this as a positive step toward broadening the reach of the PI from the development-research community to embracing the fuller spectrum of development actors.
- ▶ PAN has helped more than 100 research institutions to create websites and to fundamentally change how they communicate the results of their research efforts. These sites represent positive developments, but more work is required to enhance the quantity and quality of the information that these institutions offer.
- ▶ The PAN team has focused its efforts on Asia and increasingly on Latin America. At the present time, little work has so far been done in the Caribbean. The Middle East and North Africa region has been excluded.
- ▶ PAN's approach with private-public partnerships has been innovative and groundbreaking, and it has produced positive outcomes.
- ▶ Given PAN's primary focus in its earlier projects, the review team feels that engagement of important stakeholders was appropriate in early projects. The success of PAN requires engaging a broader range of stakeholders including the government.

- ▶ The small-grant project modality has been used effectively by the PAN PI in Asia to fund networking applications, technologies, and regulatory issues. This model of project delivery will continue to be used to fund locally important research in LAC.
- ▶ There may be a need to consider other ICT elements along with the Internet technologies that seem to build the core of the PI projects.
- ▶ A broader strategic framework is needed to enable the PI to address in a more systematic way the various and interrelated aspects of ICT applications for development.
- ▶ The review team feels that more collaboration should take place between Acacia and PAN along the same lines that have been established between Bellanet and PAN (or if such collaboration exists it should be better documented).

## Recommendations

- ▶ Given the ever-increasing importance of ICT in general, and their role as tools for development in particular, the PAN PI should continue to be a main research area and receive support within IDRC.
- ▶ The PI must examine the level of resources that are being committed to the PAN Asia site and consider applying criteria of full or partial self-sufficiency to the site. The PI should also make sure that no long-term “dependency” on the site is created among its partners that may limit local initiative.
- ▶ Only in very special circumstances would it appear reasonable for PAN to fund ISPs in future. Research into community access and the impacts of ICT on development should be supported along with research into how to create the optimal conditions for the introduced ICT applications to work and contribute to development.
- ▶ There is a need to *research* the actual and real demand of the target communities (those that are disadvantaged and marginalized), and then *design and supply* applications and products that specifically address these needs.
- ▶ The PI should encourage efforts to develop a demand for *applications* based on modern technologies (and not necessarily the technologies themselves). Commercial undertakings use “market development” to create the demand for what they want to sell. PAN should support efforts that experiment with methods to create this “pull,” which is essential if ICT are to be adopted and integrated into activities that actually serve development.
- ▶ The PI should make a special effort to engage the government sector and encourage broader access to their information resources. With regard to content development, PAN should investigate the possibility of public–private collaboration to publish and add value to government information to make it more accessible and useful.
- ▶ Projects that seek to link Internet use with the existing “communications mix” within rural communities are extremely positive. We support evolving the RadioNet project to become global. Consideration should be given to extending such activities to include other traditional media such as government radio and television, newspapers, and with some innovation, to intermediaries who use a verbal tradition to relay information (teachers, social workers, health providers, etc.). In particular, it is important to recognise the adaptability of youth and to develop specific activities that engage school children and students. New mechanisms for community access will be increasingly important as efforts are made to apply ICT to development work. These efforts should be encouraged by the PI and linked to appropriately designed research to try to measure impact.

- ▶ Efficient voice communications, real-time transactional applications with guaranteed response times, remote sensing and imaging, and resilient wireless voice/data networks are essential ingredients of new ICT applications that can lead to more efficient governments, financial and economic operations, national and local planning, and disaster preparedness. PAN should not exclude these ingredients from its project mix.
- ▶ The review team strongly supports PAN’s efforts to use Internet technologies to present research findings and to summarise and synthesise experiences. The PAN sites could as well make greater efforts to present project findings and pull together PI experiences.
- ▶ The mandate of research to explore new technologies should be expanded beyond the evaluation of the technologies themselves to give special attention to developing low-cost versions and alternatives of these technologies particularly suited for deployment in developing environments.
- ▶ In its training activities in future, PAN should focus its efforts on helping its recipients make more efficient use of the technologies and software available to develop the “virtual” space as a means for collaborative work and a mechanism for information sharing.
- ▶ ICT, in some situations, can help overcome barriers such as language. PAN should continue to support efforts to develop character sets for languages that cannot yet be depicted on computer screens and encourage its partners to investigate the use of on-line translation to facilitate electronic conferences.
- ▶ The PI should make a special effort to extend its work to include the Caribbean (or specifically limit itself to Latin America). The review team is concerned about the lack of Centre support for Middle East and North Africa and believes this should be addressed as a matter of Centre policy.
- ▶ PAN should ensure its own projects in Asia and LAC benefit from their mutual experiences and that the experiences of Unganisha with regard to such applications as the use of listservs and electronic conferences are available to its partner organisations. On a broader level, PAN should continue to collaborate with Bellanet to ensure that there is sufficient global sharing of lessons learned and seek opportunities to work more closely with Acacia.
- ▶ IDRC must come to grips with public–private partnerships because some arrangements have been turned into traditional grants near the end of the project because of difficulties in fitting them to the existing models and procedures. As other commercial opportunities are explored (perhaps with respect to content development), IDRC must ensure that its policies are clearly developed and are supportive of such innovative approaches.

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*In addition to discussions and valuable input provided by members of the PAN team, the reviewers consulted the following sources.*

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