

IDRC - Lib. 108352

A Community-based Electronic Environmental Network in the Msunduzi River Catchment: A Review and a Model

IDRC/Acacia Initiative
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August 1998

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Preface

This is a work in progress that will, we hope, contribute in some small way to the rehabilitation and sustainable development of the Msunduzi River catchment and to the social development of its residents. Please provide us with any comments or criticism that you might have. Through this process its contents will be developed and refined into a formal technical by the end of the project.

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The International Context: The Acacia Programme

"Left unchecked, the globalization of information will widen the gap between developed and developing countries. It will further distance elites from the general population and it will limit traditional social and economic development efforts."

This quote is extracted from a description of the Acacia Programme. This programme is designed and led by the International Development Research Centre, and its focus is sub-Saharan Africa. The programme is intended to:

- demonstrate how access to information and communication technologies (ICTs) can contribute to

enable communities to solve development problems in ways that build upon local goals, cultures, strengths and processes;

- build a body of knowledge identifying the policies, technologies and methodologies that are most instrumental to promoting affordable and effective use of ICTs by poor disadvantaged communities and
- create a growing momentum in support of rural access.

Acacia has defined three programme approaches:

- integrated national strategies;
- sub-regional projects that extend elements of the national strategies or which test particular methodologies or approaches; and
- regional research themes which address a set of crosscutting issues (gender, human resource development, research, technology).

This project is a contribution aimed at satisfying the purpose of the Acacia Programme and falls directly within the second programme. It is designed to inform and contribute to the formulation of a national strategy, and to test particular methodologies and approaches. However, it is also an operational project its purpose is to provide direct benefit to disadvantaged communities in the Msunduzi River catchment.

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The Local Context: The Msunduzi River Catchment

The Msunduzi River catchment is 540 km² in extent and contains over 500 000 people, 400 000 of who live in the urban and peri-urban area of Pietermaritzburg-Msunduzi (Fig. 1 overleaf). The balance live predominantly in the rural area of Vulindlela which forms the upper catchment. A great many of the people living in the catchment come from disadvantaged backgrounds, are poorly educated, and have limited understanding of environmental and development issues. This, combined with inappropriate development and land use by administrative and management authorities, and commercial and industrial interests, has caused a significant decline in the environmental health of the catchment. We believe that poor environmental health contributes towards social instability, and also apathy towards the environment. Conversely, good environmental health can contribute towards a sense of belonging, community pride and social stability, as well as reducing community health problems.

Together with the Department of Water Affairs and Forestry (DWAF), Umgeni Water had earlier embarked on the Mgeni Catchment Management Plan of which the Msunduzi Catchment forms a part. This initiative identified the following key issues in the Msunduzi Catchment (related to water quality and quantity):

- High levels of faecal contamination indicating that water supply and sanitation systems (including educational systems) are inadequate.
- High levels of sediment entering storage dams indicating high rates of soil erosion caused by inappropriate land use and civil engineering practices.
- High levels of phosphorous caused by industrial discharge and run-off from cultivated land.
- Metal contamination caused mainly by industry and motor vehicles
- Aquatic health declining because of the invasion of alien riparian (riverine) vegetation, pollution and natural habitat destruction.
- Flooding periodically accounting for a number of lives and livelihoods.

A short walk in the Azalea area of Greater Edendale is sufficient to bring into stark reality the problems faced. Gashes of soil erosion caused by over-grazing; external pit latrines oozing raw sewerage into adjacent streams; smashed standpipes spewing thousands of gallons of water into stormwater drains; formal homes constructed within flood risk areas, or directly in wetlands and stream-beds; cuts and fills of a construction site with no rehabilitating vegetation covering them; litter in all conceivable forms strewn along the riverbanks; and of greatest concern, the number of people unemployed and at home. There is little evidence

of an ethic of caring on the part of planners, developers, administrators and residents. Nobody is blameless. There are no innocents.

One of the keys to addressing these issues is improving the understanding of those whose actions impact the environment - not only the poor but also industrialists, developers and city administrators. A lack of knowledge on relevant issues can lead to poor environmental health and/or an inability to rectify the problem. Conversely, an information "overload" can be overwhelming without the necessary guidance on how to filter out the relevant information in order to use the knowledge to improve environmental quality. People from all socio-economic sectors need to understand the consequences of their actions. Only through this will people modify their behaviour towards the environment. The basis for improved understanding is access to information and increased interaction between and within socio-economic levels and sectors. (The Greater Edendale Environmental Network and the Institute of Natural Resources held a community-based workshop with about 50 participants in Pietermaritzburg-Msunduzi recently. The objective was to introduce community leaders to the concept of Integrated Catchment Management and to establish a common vision for the catchment. The community leaders cited a lack of information as one of the major constraints to effective environmental management of the catchment.) For the vast majority of people, gaining access to information and interacting through formal education on environment and development issues is not a realistic option. Gaining knowledge and understanding which allows people to make informed decisions about their lives and the environment has to take a different and less formal route. "Local - Local" dialogue - interaction and the exchange of information between community groups, between community groups and experts, and between community groups, NGOs and government (local, provincial and national) - is essential so that different perspectives are understood and all parties are empowered to take decisions and act effectively.

GREEN and the INR are both at the interface of these divergent socio-economic sectors - both have extensive formal and informal links with community groups, university departments, government, Non-Governmental Organisations (NGOs) and the private sector. Together, in partnership, we are ideally placed to facilitate interaction and information transfer within Pietermaritzburg-Msunduzi and in the entire catchment. Indeed, we are already doing so, but we wish to formalise and structure this role so as to be effective. Our common vision is to empower others so that society can effectively manage its natural resource base.

The historical roots of this programme go back to 25 December 1995, where the need for improved information management and communication in a catchment context was spurred by the floods of Christmas Day 1995. This flood devastated areas of the catchment, killed 160 people and displaced over 500 families. All of these people were settled in flood risk areas. This disaster illustrated graphically to what extent marginalised and disadvantaged people have been separated from environmental processes. A general lack of comprehension and understanding of the danger of settling on floodplains, a lack of opportunities to live elsewhere, a deteriorating catchment and an episodic rainfall event formed a highly lethal combination. While a project was initiated to provide short term solutions to the flooding - simply to identify those living in areas in extreme risk and move them - there was the general recognition that a more holistic catchment management approach was required, in order to solve the multifaceted problems that exist in the catchment. With funds donated by the GTZ Rural Development Foundation, four organisations teamed up to form the Msunduzi Integrated Catchment Management Initiative. They were:

- Institute of Natural Resources (INR)
- Greater Edendale Environmental Network (GREEN)
- Computing Centre for Water Research (CCWR)
- Share-Net

Activities in this initiative included:

- the establishment of a conceptual and contextual basis for achieving sustainable development in the Msunduzi Catchment
- compiling a data base of catchment stakeholders
- the establishment of a catchment management "leadership group"
- the development of a common vision amongst stakeholders of what the desired state of the catchment

might be and how this might be achieved

- active involvement in community-based initiatives so as to achieve an improved understanding of catchment based problems
- the formulation of information management and education strategies
- the development, through these initiatives, of an Integrated Catchment Management strategy for the whole catchment.

In investigating this approach the critical role of communication and effective information transfer became apparent. The opinion was expressed that if disadvantaged communities gained access to catchment-based information relevant to their lives and livelihoods it would place them in a better position to respond. One way of creating, sharing and accessing information is through the Internet. There is general agreement that for any catchment-based activity to be successful effective communication and co-creation of information is vitally critical. The sharing of information, and co-ordination of actions based on that information between and within sectors and levels of society, is also important. A specific issue is access to relevant information, and effective communication with, organisations that represent the various communities resident in the catchment. So as to address this, the INR, with technical and conceptual support from the CCWR, commenced with a pilot project in establishing three electronic communication and information centres within or linked to communities, and operated by a community-based organisation:

- i. Indumiso Environmental Awareness Society (IEAS);
- ii. Greater Edendale Environmental Network (GREEN); and
- iii. Sobantu Environmental Desk.

Success was mixed, but progress has been made in the following areas:

- Training in computer skills and electronic networking is taking place;
- IEAS and GREEN have established their own websites / homepages;
- GREEN has compiled its own newsletter located on the home page and also distributed it as hardcopy to community representatives.
- Both groups are interacting regularly with institutions and accessing information off the Internet. Feedback from the various activities that the groups carry out in the catchment area is also fed into their websites.
- Sections of the computer based Integrated Catchment Information System (ICIS) have been loaded to the IEAS computer and members are inputting and manipulating data collected on field trips
- Establishment of the Sobantu site has commenced.

There is a fundamental need to increase the number of sites and to encourage other initiatives/organisations to fund their own sites so as to increase the flow of information to and from community groups and to improve communication. There is also a need to formulate, test and refine a communication and information-sharing model for broad catchment-based application. This is where this project is relevant, that it aims to increase the number of sites from where knowledge sharing can take place. Although the project is aimed at the residents of peri-urban and urban areas it is important to include also those rural residents in the upper catchment. Their activities impact on the urban environment downstream and so their participation in the project process is critical.

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Project Goal and objectives

Goal

Improved decision making through effective communication and information management on environmental and development issues among communities and institutions in the Msunduzi River catchment.

Objectives

1. A review of the international, national and local experiences of community-based communication information systems
2. Community-based electronic network in the Msunduzi River Catchment expanded (from three to eight hubs) and operating effectively as a medium for improving environmental decision making.
3. GREEN established as an effective central hub in the electronic network.
4. Representatives of participating organisations computer literate and effectively able to network electronically.
5. Representatives of participating organisations aware of environmental and development issues and consequences and able to jointly take decisions to resolve these issues.
6. Representatives of participating organisations transferring their understanding of environment and development issues to the broader community.
7. Information on environment and development issues in the Msunduzi River catchment consolidated, accessible and understandable to communities.
8. Formulated, tested and validated electronic information and communication model that focuses on community groups, that can be applied broadly at local and regional level and that informs a national strategy.
9. Effective evaluation of the project.
10. Ongoing networking activities planned, developed and funded.

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A Review of Literature And General Experience

The World Wide Web as a publishing and communication medium makes information available and accessible to a wide audience, including marginalised communities. Information and communication technologies (ICTs) empower people by providing them with access to information that was previously difficult to obtain (Graham 1997). There is considerable local knowledge and wisdom in rural and peri-urban communities that is unprocessed; there is also external information that is unavailable to these communities, but which can help them to become more knowledgeable (Fuchs 1997). Access to information, through ICT-based tools, can enable communities to solve their development problems and reverse the trend towards marginalization. Through the use of ICTs, disadvantaged communities are able to participate in decisions which affect them directly, instead of the decisions being made by metropolitan centres and international development organisations who are often removed from the problem (IDRC 1998c). E-mail can help change the dynamics of group discussions, and can reduce the cost of face-to-face meetings (Young 1998), since e-mail is able to overcome the barriers of distance and time (Graham 1999). A recent rough estimate indicates that the Internet has reduced inflation in the USA by 1% through improving business efficiency (SABC News Bulletin). ICTs can provide information both at an individual level, and also at a group level. Groups of individuals connected through ICTs can work to:

- create new organisations, and develop new partnerships
- impact policy development and change approaches to governance
- create awareness of development issues
- improve understanding and levels of knowledge regarding the issues for which the ICT caters (Young 1998); in this case it is environment and development issues

Groups of informed users form group clusters which:

- attain higher levels of influence, and concentration of resources and abilities
- work toward sustainable development goals through issue/sector/interest-based clusters
- power human development through co-ordination and influence

The tool sets of ICTs can be split into two groups viz. Personal tool sets (used by individuals) and group

tool sets (address the collective needs of groups). The former includes access to personal computers; access to email and databases; access to the World Wide Web. The latter include virtual conferencing systems, records or infrastructure management systems (GIS, health records management systems). A mix of personal and group tool sets occurs when there is a partnership between a community and an institution. Selection and adaptation of such tool sets should be determined by each community (IDRC 1998c).

In business, ICTs are used to increase efficiency and productivity. In communities, the objectives differ. Here, the objectives of ICTs are to:

- achieve the sustainable growth and development of the community;
- facilitate self-reliance and control over local affairs; and
- enhance equity and inclusiveness within the community (IDRC 1998b).

A more detailed discussion on the uses and applications of ICTs in communities, based on actual project Asia, Latin America and Africa, can be found in Graham (1997).

Based on the review of literature, it would appear as if the initiative to establish ICT hubs for the express purpose of making information on environmental and developmental issues is a new one. Health, legal, business, education and agriculture ICTs have been the main focus thus far. This review of general experiences realises the first objective of this project.

An information-sharing initiative can be divided into three broad phases viz. planning, implementation and capacity building.

The planning phase

- The human element is the most important ingredient that will contribute towards the success of ICT (Young 1998). A primary task is to gauge a community's (or group's) level of interest and understanding. Participatory approaches, such as Participatory Rural Appraisal (IDRC 1998a), should be used to identify community needs and priorities, including sensitivity to existing power relationships, ensuring access for all levels of the community (IDRC 1997). "Close attention to community needs and appropriately targeted information services and products are crucial if local communities are to benefit from ICTs" (Graham 1997).
- ICTs are a means to an end, not an end by themselves; the euphoria of the ICT options should not override what is possible, practical and sustainable. It is essential to ensure that communities do not harbour unrealistic expectations of ICTs (Young 1998).
- Communities need to become comfortable with the concept and use of ICTs (IDRC 1998a), and the technologies and their capabilities must be explained to all, especially women and young people (IDRC 1997). The most effective use of ICTs occurs when the potential impact of the medium is understood and when a strategic plan of action has been developed (Young 1998). The use of traditional media (discussion groups, radio, television, videos and films) can effectively communicate the power of ICT (Graham 1997, IDRC 1997, IDRC 1998a). It is of great benefit to demonstrate, at the outset, the Web and e-mail are capable of (Fuchs 1997). It is time well spent to help individuals (or groups) understand the value of information, and the tools that can be used to access it (Fuchs 1997). Trust between potential users can be established through face-to-face meetings (Young 1998). Information should be within the context of local culture (IDRC 1998a, Young 1998). Local sources of knowledge and information must be promoted (IDRC 1997). Local artists can be engaged to produce a range of appropriate artwork that can be packaged as clip-art (IDRC 1997). This is a useful way of eliciting local support and building in elements of the local culture which the community can identify with. Content should be simple, suitable for children, culturally sensitive and locally relevant. The use of local languages (where possible) provides for horizontal communication, attractive to end-users. (IDRC 1997).
- Careful management is required to ensure that ICT applications close, rather than widen, the gaps between urban elites and marginalised rural populations (Young 1998). Marginalised groups, who are not usually part of decision-making processes, but who have their own particular perspectives to contribute, need to be included (IDRC 1998a). The youth must also be included, since it is the youth who are the future leaders and decision makers (IDRC 1998a).

- Groups (CBOs, NGOs) who will benefit from ICTs need to be identified (IDRC 1998a) and linkag with NGOs and CBOs working at the local level need to be indicated (IDRC 1997).
- It is better to focus on solving a specific need in the community, rather than aggregating demand in initial stages of infrastructure development (IDRC 1998c).
- Local champions should be identified and brought into the process from the start. There may be opposition from those in traditional positions of power who are not made champions (IDRC 1997).
- There must be active community participation in the design and management of networks (IDRC 1997). Needs/wants lists from the targeted communities in the Msunduzi catchment need to be established in the early stages of project planning. The questions of "what do the communities expe versus "what can INR and GREEN supply?" need to be compared, to ascertain how big the gap is between expectation and reality.
- Appropriate technology should be used, and kept as simple as possible. There should be technical back-up available (IDRC 1997). "State-of-the-art" technology, which has yet to be tested, and "hand-me-downs", should be avoided; "state-of-the-market" technology which is known to work is recommended choice (Fuchs 1997).
- Each hub should be able to function as an autonomous entity; once the initial funding period is ove one hub folds, the others will be able to continue functioning. Also, sufficient freedom needs to be given to each hub, to allow for innovation and initiative. It should also be stressed that the technical members of each hub are present in a technical capacity, and are present to act as channels for information flow from the hubs to the community.
- Continued staff training, and continued awareness-building in the community, are important for the hubs to continue functioning efficiently (Fuchs 1997, Graham 1997). The costs involved for any training courses should be for bringing trainees up to a satisfactory level of competence, and not fo fixed number of days.
- "Empowerment is most successful when information is tailored to the needs of users. These needs should be determined in advance, and information products and services developed specifically to address these needs. Information is most useful when 'translated' into appropriate language and presented in ways that suit users' needs" (Graham 1997). Screening of information , or providing so level of analysis, to make the information more useful to the users, promotes the success of ICT projects (Graham 1997). Based on the Canadian experience of ICTs, a "demand-pull" rather than a "technology push" model of infrastructure development is being employed at the community level (IDRC 1998c). Identifying and defining how a community wants to use the technology is critical. hub's needs should be assessed separately. Furthermore, ICT application has been focussed to addre the particular needs of marginalised or disadvantaged groups. If this is indeed the case, the followin implications on how ICT infrastructures are deployed are:
 1. ICT infrastructure and development should be managed as a partnership between communities operators, rather than as a customer/supplier relationship
 2. communities need to be involved in the planning and decision-making processes of infrastruct development and deployment
 3. the software needs to be configured in a manner which can be adapted by communities to mee their unique needs, and which supports the development of local capacity and control (IDRC 1998c).
- In order to protect the hardware, problems such as dust, heat and fluctuating electricity will need to addressed through dust covers, voltage stabilisers and insulation in the buildings where the hardwar housed (Zijp 1994). External modems are better than internal ones, since the likelihood of lightenin damage is less. In terms of software, only the system administrator should have write-access to software application files.
- Ownership of the hubs should be by the rural or peri-urban users; the communities themselves mus able to operate the systems themselves (IDRC 1997). Ownership of the hubs needs to be apolitical. potential does exist for party political tensions arising if one party perceives that a hub is being use the "opposition" to further party political goals. The appointment of an outside party as a moderato web content should be considered, to ensure that environment and development information is not assuming political undertones. The mastery of information and communications technologies may become a status symbol, and lead to domination by certain individuals and/or groups (Young 1998)

The implementation phase

- There is no "right" or "wrong" way to start infrastructure developments. With the Canadian community experiences, the foci varied from development of physical facilities and equipment acquisitions, to development of technical infrastructures required to access the Internet, to creating local organisational infrastructures which build local capacity (IDRC 1998c).
- Since much of the web is in English, users will need help in reading and understanding words, using the software and menus. A manual with worked examples on the net will have to be provided (in Zulu) on the basic principles and workings of the Internet. It is not an infinite source of knowledge, although it is a powerful medium. In terms of environment and development issues at a local level, what can be gleaned from the Internet is only as good as the information put into any databases or web pages. In other words, knowledge sharing by the various stakeholders is only as effective as the information is put into the system.
- Links to other useful sites can be gathered and organised into a growing resource (m-powa 1997).
- It must be ensured that information is suitably packaged to make it user-friendly, in conformity with local norms, and taking literacy and education levels into account (IDRC 1997).
- Appropriate training must be provided to operators and users to demystify the technology. It must be ensured that facilities are not taken over by the technical experts (IDRC 1997).
- Theft of phone lines, which occurs regularly in certain areas, will lead to down-time.
- Typically, a community will identify an area of interest to the community, define a project requiring collective effort to implement, manage this project to deliver a quick, visible improvement, and then use the confidence and goodwill generated from this to initiate more extensive development efforts. This "evolutionary" development approach is usually employed by a community, and the top-down approach is avoided (IDRC 1998b).
- The most appropriate times for training are after-hours, and particularly over weekends, in order to cater for people who may have work commitments. Initially, training sessions cannot be longer than three hours, due to the newness of the material and the educational background of the participants. Training should begin with the basics, and assume a knowledge base of zero. In time, the duration of the teaching periods and the speed of learning may increase. It should be pointed out that staff training and community awareness building need to exist as long-term processes.
- For facilitating the flow of information between the hubs and the communities e-mail, web pages, workshops/community meetings, flyers and pamphlets (for targeting the broader audience), newsletter (aimed at a more specific audience), community radio, local newspapers and word-of-mouth are all useful communication techniques. The use of these multimedia will not only keep communities aware of environmental issues, but also of the hubs themselves, what they are capable of and what their limitations are.

Capacity building

- Partnerships need to be formed with reputable training organisations (IDRC 1998a). There must be sufficient capacity building and backup support for these centres to continue functioning once the funding has been exhausted. Hence hubs must be in a position to provide marketable services. However, the initial objectives of making information accessible to the wider community must not be overshadowed by the provision of such services.
- The time frame for pilot projects should be no more than two years (IDRC 1997). Hence it is of critical importance that capacity building take place right from the start of an ICT initiative, and should be continuous (IDRC 1998c). It must come from the communities themselves to implement fundraising so that the hubs can perpetuate themselves and keep pace with technology once the IDRC funding period is over. This can take the form of cash grants or human resources (free technical assistance) (IDRC 1998d). Local TLCs have a role to play by encouraging community-based entrepreneurship and economic development. For example, a hub can enter into a contractual undertaking with a local government structure to provide a planning service for the region's environmental or developmental needs (IDRC 1998d). Financial sustainability is important; the following services are possible: secretarial; fax; e-mail; telephone; television and video service; production and sale of local newsletters; commission and sale of local products such as handicrafts; sale of technical services to local agencies (Government, NGO) (IDRC 1997). As the number of users increases, a hub may become a victim of its own success, as it struggles to provide access to an ever-increasing number of users with limited facilities and budget (Steele 1998). However, there is the problem, in capacity building, that the hub will move away from its initial goals of community service, to that of a business, thus restoring

gap between those with access to knowledge and those without it. A framework outlining the potential roles and responsibilities of the various partnerships is useful. "Examine existing connectivity activities and examine the possibilities of co-ordination and sharing of facilities with a variety of users to reduce cost and risks, noting the high failure rate of single purpose systems. Consider using existing Internet and e-mail service providers rather than building new networks" (IDRC 1997).

- Projects should continue to solicit potential users on their information needs and on the ways in which they would prefer to receive information (Graham 1997).

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A Review of the Msunduzi Project Experience

The three original hubs

Indumiso Environmental Awareness Society (IEAS)

IEAS is not a community based organisation but rather a society operating out of Indumiso College of Education. However, the students are all black and most of them reside within the catchment. Reasons for establishing a hub at IEAS were as follows:

- It was (and is) an active organisation with enthusiastic members with catchment-based projects (such as river and stream clean-ups, indigenous tree planting).
- They were mentored by an enthusiastic staff member.
- They already had access to a computer and simply required a modem and a budget to dial-in to become operational.
- Members were computer literate

Initial success was considerable. With the assistance of staff from the Institute of Natural Resources and Computing Centre for Water Research IEAS members designed and posted a home page www.ccwr.ac.za/indumiso. They also began exchanging information with other organisations. However, continuity and momentum were not maintained:

- The staff mentor was transferred and his replacement did not share a similar enthusiasm for the initiative.
- The students participating in the project spent considerable time away from the College either on teaching assignments or on holiday, or were busy with examinations. This meant that communication and training were erratic at best.
- Membership of the Society changed considerably from year to year as students graduated and moved on.
- The staff member at the Institute who was interacting directly with IEAS and providing training resigned and the direct line of communication was broken.

Greater Edendale Environmental Network (GREEN)

Under the leadership of Sandile Ndawonde, and with the assistance of a commercial service provider GREEN established the necessary electronic linkages in 1996. The INR and CCWR's role was to provide *ad hoc* advice on the content and layout of the home page. The hub at GREEN www.pmb.pix.za/green is a significant success that can be attributed to the following factors:

- The vision, understanding, competence, computer literacy and ongoing presence (continuity) of a dedicated co-ordinator.
- The ability of the hub to function without the dedicated training of those operating it.
- The financial resources available to the organisation through project funds.
- The ongoing generation of information (for example, newsletters) appropriate to post on the home page.

- Presently GREEN has a comprehensive homepage and communicates extensively with its technical more sophisticated constituents through Internet. Electronic communication has been adopted as an integral and day-to-day part of the organisation's operation.

The Sobantu Environmental Desk (SED)

SED is a community based organisation and a sub-committee of Sobantu's Development Committee/for It represents, more typically than GREEN and IEAS, the character of community-based organisations that occur in the catchment. GREEN and IEAS are unusually sophisticated in terms of education levels, their computer literacy and their financial resource base. By contrast, despite being engaged in environmental initiatives (waste management, environmental awareness etc) SED has no funding base, and its members generally have no computer experience and poor educational levels.

Three of its members were provided with formal computer skills training through the University of Natal. An observation by their trainer is worth noting. While all three were extremely slow to grasp the rudiments of computer skills when faced with a complex keyboard, as soon as the training progressed to networking where the manual operation is simply 'point-and-click' with a 'mouse' progress improved markedly. A computer was placed on permanent loan with the SED, the required electronic linkages were established (dial-in) with a commercial service provider and on site training was provided. Certain factors have led to the temporary disconnection of the electronic linkage:

- When on-site training was taking place and the trainer was unable to link into the nearest point of presence (POP) he would then, on the advice of the service provider, link in through Johannesburg. This was an extremely costly exercise in call charges;
- When trainees were dialling up to establish a linkage the service provider's switchboard would accept the call and then 'hunt' for an open line. If none was found the call would be terminated. Due to pressure on the resources of the service provider this was an extremely regular occurrence. Trainees would often dial in excess of thirty times before an open line was found. Apart from the frustration, each call was charged for. Simply establishing a link might cost R5 - R10.
- Trainees would either forget or not know how to terminate the linkage and calls costing in excess of R50 would accrue at times.
- Trainees accidentally erased programme files compromising the system.

Members of SED have been included in the current project and are receiving formal and more comprehensive training in computer skills, and a more sophisticated computer and software.

General observations to take forward

Fundamental assumptions and acknowledgements

At the outset it is acknowledged that certain fundamental assumptions are being made. We assume that if residents of the Msunduzi River Catchment gain improved understanding of environmental issues, they make better decisions on activities that cause adverse environmental impacts, which in turn will lead to improved environmental performance in the catchment. This, in turn, will lead to improved quality of life for its residents. In other words, we assume that if people know more about the environment they will appreciate the benefits it offers and take greater care of it so as to enhance the benefits. We assume that, with training, those representatives of community-based organisations who have been selected to participate in the initiative will be able to engage the broader community on environmental issues and alter behaviour patterns. As a corollary to this, we assume that there will be sufficient community participation to allow the transfer of knowledge from the hubs to the community. We assume that the day-to-day battle for socio-economic survival of the average resident does not preclude him or her from thinking about, engaging in and responding to environmental issues.

We acknowledge that these assumptions are necessary. This is a pilot study - a journey of exploration which, it appears, not many have traveled before though many have spoken about it. We also acknowledge that this project is only the first phase of what must be seen as a long-term initiative. In the first sixteen months training and education will be provided to enable participants to operate a networked computer

effectively and to understand more about environmental issues that effect their daily lives. It is only when these people engage the broader public as leaders and communicators will meaningful benefits begin to accrue. We acknowledge that we cannot expect total success. If, of the total of eight hubs, four operate sustainably in the long term we think we can claim success.

It is critical that we, as project managers, acknowledge at the outset that through providing computer skills training and education on environmental issues to a select few representatives from community based organisations in the catchment our impact will be limited at best. The key to success is the ability with which these individuals can target and influence the broader community. It is the ability of these people influence societal action in the catchment that will make the difference.

Continuity and location

Specifically the IEAS experience indicates that without continuity of participation and interaction the hub of limited benefit. Scheduling training and interactive sessions and maintaining personal contact is difficult especially where the operators of the hub are changing frequently, as is their focus/interest. It is also doubtful whether strong links between the hub and the broader community can be maintained where participation is so fluid. It is concluded that, while locating such hubs at educational institutions might be considerable educational benefit, the benefit is of short-term duration and unlikely to spread much beyond that institution. It would be preferable to locate hubs within community-based organisations with proven continuity in terms of staffing and linkages to the broader community. In the specific context of the Msunduzi River Catchment and the apparent chaos in education in the area it seems prudent not to locate these hubs at schools or other educational institutions in the area. However, in areas where schools form community focus, or in the absence of a strong CBO presence or necessary infrastructure (telecommunications, electricity) they might be the option of preference.

Enthusiasm and commitment

Although obviously central to any initiative there has been no indication of any lack of commitment and enthusiasm. How long this will be sustained is difficult to assess but if we take the undiminished global enthusiasm for electronic communication media as our example it is likely that the interest will be maintained. There is another driving force: many of the project participants are unemployed; the training and experience they receive is seen as a possible vehicle to finding a job.

A networked computer - the means or the means and the end?

Many have stated that a networked computer is merely a communication and information tool, that is on means to the end. Especially in the context of marginalised, disadvantaged and poorly educated people this is a fairly naïve comment. It's like saying a motor vehicle in western society is only a mechanism of transport and clothes are purely functional items to keep one covered and/or warm. These statements fail to recognise that possession, access to and/or the ability to use the tool (car, clothing or computer) contributes to one's status in society. Simply the act of being able to operate a computer increases one's self-esteem and self-worth. This ability is empowering in itself and should not be underestimated. A networked computer is a means, it is a tool, but is also an end in itself; its value goes beyond the utilitarian. Also, the information available from access to the Internet is not only the means by which one's behaviour is altered. Much of the information will only have light entertainment value. Information is also a means and an end.

Proficiency/competence/skill/understanding

Experience has shown that lack of adequate computer skills training results in costly mistakes and considerable frustration on the part of both participants and project management. Significant investment in training at the outset will definitely pay-off in the long term. It also appears that training in a formal training environment (formal classes but interactive) is more effective, especially from a cost aspect than informal one-on-one sessions. In environmental education sessions community participants appear to prefer structured yet interactive workshop type sessions focussing on particular issues rather than formal tuition classes.

Security

We fully expect to lose computers to theft and/or vandalism. It is understood that the University of Natal attempted a similar initiative but lost all the computers to theft. To minimise this it is suggested that ownership of and responsibility for the computer (including compulsory insurance for the project duration) be taken by the CBO and its members from the outset. Once the computer skills training is complete the computers will be donated to the CBOs. It would not be feasible for an organisation such as the INR to attempt to maintain control, through ownership, of the computers that are located in a broad geographic range. Project management will insure that security at each site is adequate and that insurance is obtained.

Ongoing training and systems support

It is unreasonable to expect to set up a system, get it working and then disappear. Provision needs to be made for ongoing support in the form of further training, and hardware and software upgrades. In the short term external funds will be required for this but in the long term one should strive to empower the CBO sufficiently that it has its own funding base and uses its networked computer as a service that generates funds to sustain its operation and improvement.

Funding and Finance

Operating an electronic hub involves numerous direct and hidden costs. These include:

- the capital costs of the equipment and software (including virus protection), and upgrades of both as they become available;
- dial-up costs (telephone calls);
- service provision fees (if connected to a commercial service provider);
- stationery;
- servicing

Usually CBOs will be operating on a zero to minimal budget so two things have to happen. Firstly the CBO needs to raise funds and secondly it needs to minimise cost and maximise efficiency. Raising funds is a difficult field and will only be discussed here in the context of using the networked computer to provide a commercial service. Here are a few ideas:

- Solicit advertising for the home page.
- Generate documents at a price for residents (CVs etc).
- Charge an Internet access fee to residents which allows costs of usage to be recovered.

There are also a number of options for minimising costs:

- Use the network in off peak hours when telephone calls are less expensive
- Use a non-commercial server with dial-up facility to locate a website or to provide access to the Internet (e.g. universities).
- Protect programme software from corruption through suitable programming. (Service and software providers indicate that much of their business arises from users unintentionally corrupting programs)
- Encourage discipline so minimum time is spent logged onto the Internet for maximum benefit.
- Ensure that log-off procedures are clearly understood and there are suitable prompts.
- Have a small window on the computer screen that keeps a tally of the cost of the call. This provides direct awareness of the cost.

Limitations

A networked computer is a communication and information tool, it provides for recreational opportunities and it does bring status to the owner and/or operator. The opportunities that it provides are significant but should not be seen as the solution to all problems. It does not replace other means of communication or information generation. It does not replace direct face-to-face interaction. It can also sow seeds of division between those who are perceived to benefit from its presence and those who do not (it can create elitism).

the community level). It is also subject to the vagaries of other services (telecommunication and electricity

It can also be of limited use where a prime institutional target of community communication does not have the technology. A prime example of this is the Pietermaritzburg/Msunduzi Transitional Local Authority which has no external E-mail or Internet facility.

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Msunduzi Information Network Process and Model

The first six months of the project have drawn to a close. What can already be noted is the growth in confidence of the trainees between the first training session and now, when the training is nearing completion. The models (figs. 2, 3) are based partly on experience and partly on postulation. They are a beginning. How accurate the models are will only tell with time. The physical steps involved in initiating network of information hubs are outlined in figure 2. The conceptual framework for an information and communication network, and where it links into an hypothetical decision-support system, is illustrated in figure 3. These models are working documents, and will be refined over time.

Figure 1: Hub Locations and Land Uses within the Msunduzi Catchment

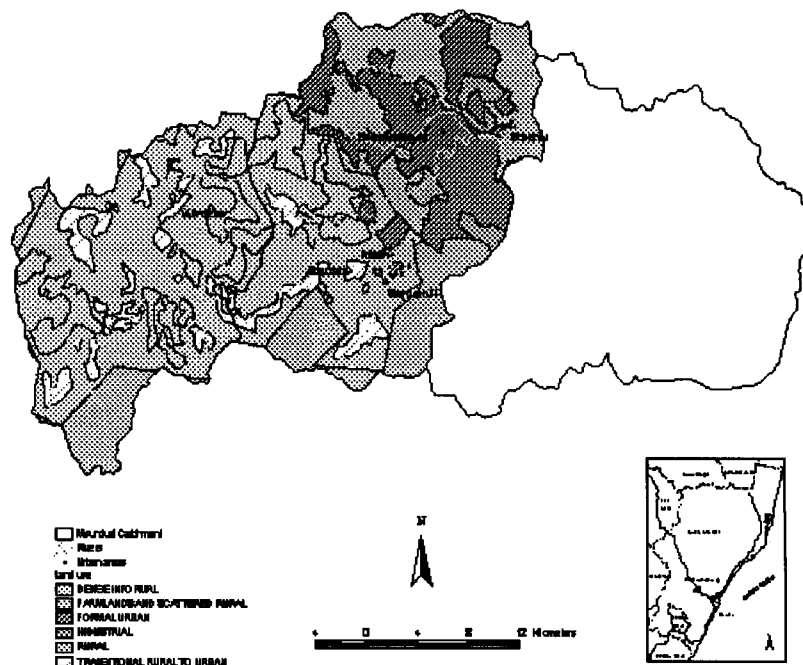


Figure 1: Hub locations and land uses within the Msunduzi Catchment

Map by Msunduzi Catchment Authority (1998/09/22)

Figure 2 : A process model for establishing information hubs

A PROCESS MODEL FOR ESTABLISHING INFORMATION HUBS

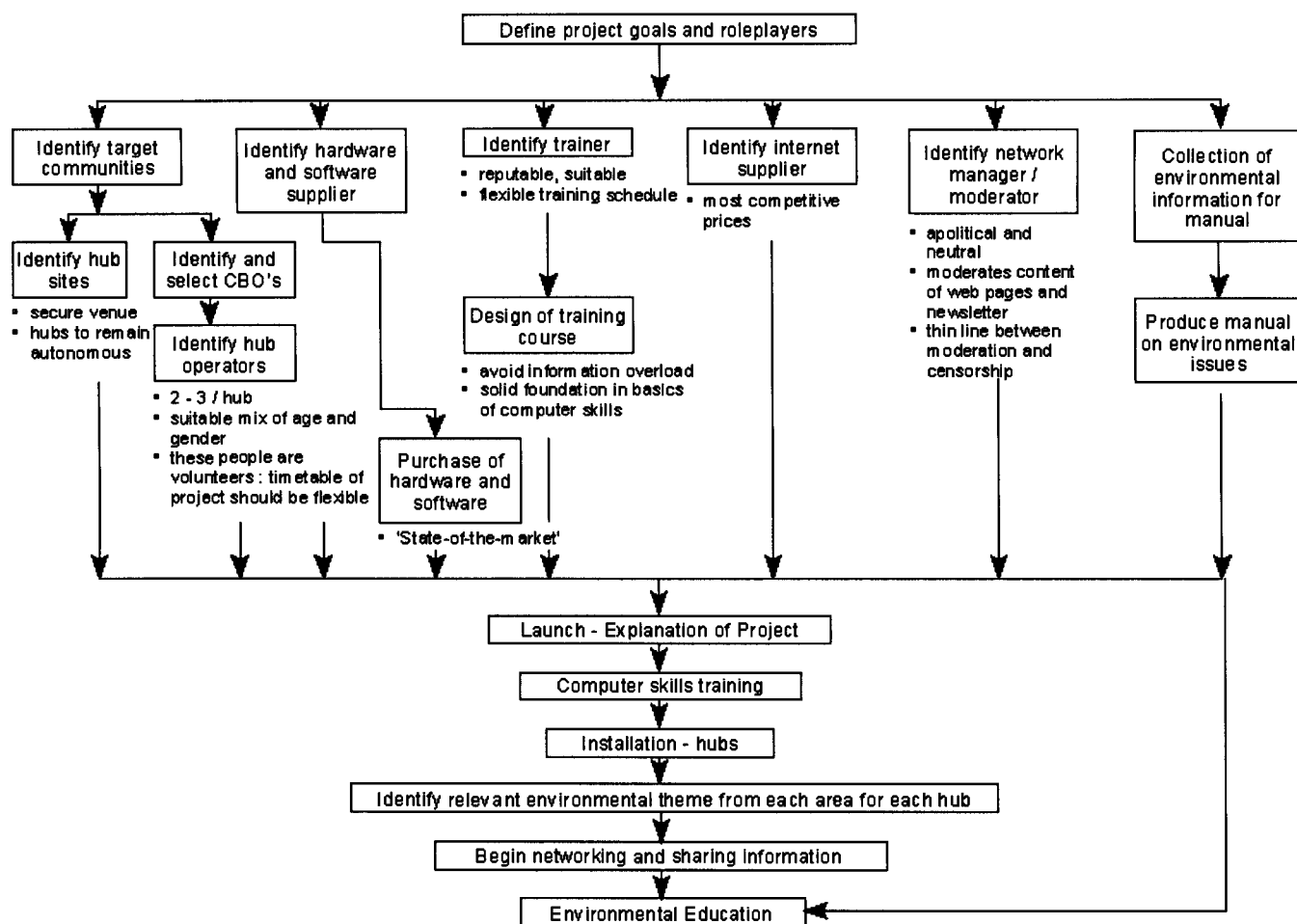
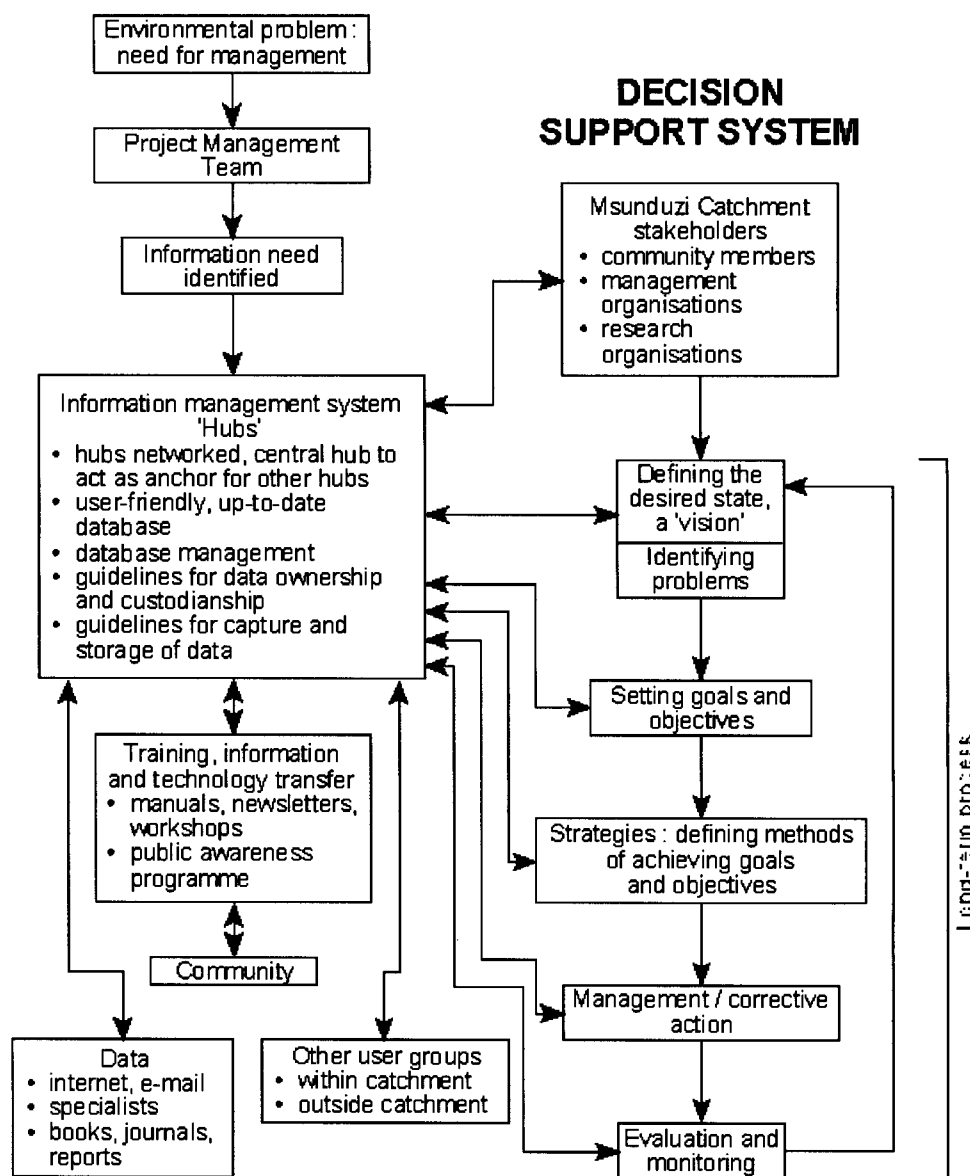


Figure 3 : Information management system and how it relates to a decision support system



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