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Dissemination pathways and indicators of impact on development: a review of the literature.

Abstract

A review of the literature on the different dissemination pathways and dissemination impact indicators from both development-related and other disciplines. For dissemination to be interactive, efforts should be made to facilitate a cyclical model of communication that reaches as many stakeholders as possible. Outlines the debate surrounding the use and promotion of ICT in low and middle-income countries and explores the potential of more traditional methods of dissemination. Decisions about which pathways to use should be informed by what can be known about users' information use environments, based on a checklist of questions about the users, the source, the content and the medium. Provides examples of factors that indicate dissemination impact and the methods that have been used to assess the impact of dissemination pathways. Concludes that the results of such monitoring activities should themselves be disseminated and used to modify and improve current dissemination projects, to complete the cycle of communication flow.

1. Introduction

In recent years, the importance of the dissemination of research has been recognised, both in the development arena and in disciplines such as health and social policy. Saywell and Cotton (1999) provide a useful overview of these developments and the concerns that have been expressed by international fora, sector professionals and resource centres. The United Nations Conference on Environment and Development (UNCED) identified weaknesses in information management and sought ways to improve the sharing of experiences and dissemination of information. Chapter 40 of Agenda 21 argues that all stakeholders are users and providers of information, thereby indirectly emphasising the need for dissemination. These concerns have filtered down to key institutions in the international community such as the Research Councils in the UK and the European Commission which both specify that research proposals should outline strategies for dissemination and user engagement. Dissemination has been highlighted by the World Bank (1998) for its role in advancing economic and social well being; DFID (1997) links knowledge sharing to its aims of international development. Similarly, the Global Development Network (Stone 1999) reflects the concern to bridge the gap between knowledge and policy, by encouraging decision-makers to use the results of research.

This review focuses on the dissemination of research outputs by the researchers or those within their institutions with responsibility for dissemination. The main target audiences in this case are NGOs, CBOs, local government and development agencies. Beyond this specific range, research is shared amongst those involved in international and national research and the academic and student community. Increasingly, it is recognised that researchers are seeking to reach the beneficiaries themselves, either directly or through intermediaries and extension services (DFID 1999). For this reason, this discussion extends to all these groups.

The difficult process of knowledge sharing means that it is often neglected (Saywell and Cotton 1999) and a significant amount of research is never communicated beyond its immediate circle of interest. Saywell and Cotton (1999) have described three broad implications of this for development: the need to address the failure of existing policies and methods, the need to avoid the loss of knowledge and the need to ensure value for money.

In order to meet these concerns, channels need to be developed to transmit information to the broadest possible audience (Max Locke Centre, 1998). Secondly, the mass of knowledge that exists for potential dissemination should be formatted into different versions that meet the various needs of target audiences. Both of these initiatives would address the final implication of cost-effectiveness as maximum returns on investment would be realised (Stapleton 1983).

The following literature review is part of Phase Two of ENGKAR project R17127 which aims to develop further some of the themes and issues which emerged from Phase One (Saywell and Cotton, 1999). Phase One utilised a multi-layered methodological approach incorporating:

- a review of the literature on dissemination of research by this and other disciplines;
- a case study approach of the dissemination activities of a variety of research contractors;
- a compilation of the different dissemination pathways used by DFID contractors.

Phase One achieved several stated objectives including:

- furthering our understanding of current approaches taken by sector-based agencies to the dissemination of research;

- an initial analysis of commonly used dissemination strategies;
- identification of some of the factors that constrain and facilitate the dissemination process;
- some tentative guidelines for those planning a dissemination strategy.

The key findings of the Phase One literature review are summarised by Saywell and Cotton (1999, p.3). The main message is that ongoing dissemination of research is a vital component of any project in the development sector. The most effective approach combines multiple dissemination media and pathways, selected for their suitability to the needs and resources of the particular target audiences. Assessing the impact of dissemination ensures its continued efficacy, although it is important that the impact of the dissemination method should not be confused with the effects of the application of the research.

The brief for this literature review is based on the recommendations for Phase Two which identify areas for further investigation (Saywell and Cotton 1999, p. 48):

- Firstly, more needs to be known about the information needs of users (in this case, NGO's, government and development organisations) and the ways in which constraints to accessing that information can be overcome. In this way, we can develop more user-focused criteria for effective dissemination which take into account these factors and which allow existing barriers to be set aside. To this end, more needs to be known about mainstream and traditional information channels that are used by the different target groups.
- The second area of concern is to investigate how the impact of different dissemination pathways can be evaluated. Related directly to this, we need more information about what are useful and measurable indicators of dissemination impact.

As in Phase One, a raft of methodologies will be employed in this stage of the research. However, this literature review encompasses each of these areas of investigation and provides an extension of the Phase One theoretical framework against which the other research activities will take place.

Although this study examines the issue of information provision, it acknowledges that in any study of the impact of information, the development issues need to be the focus of attention rather than the information provision in itself (Menou 2000).

1.1 Methodology

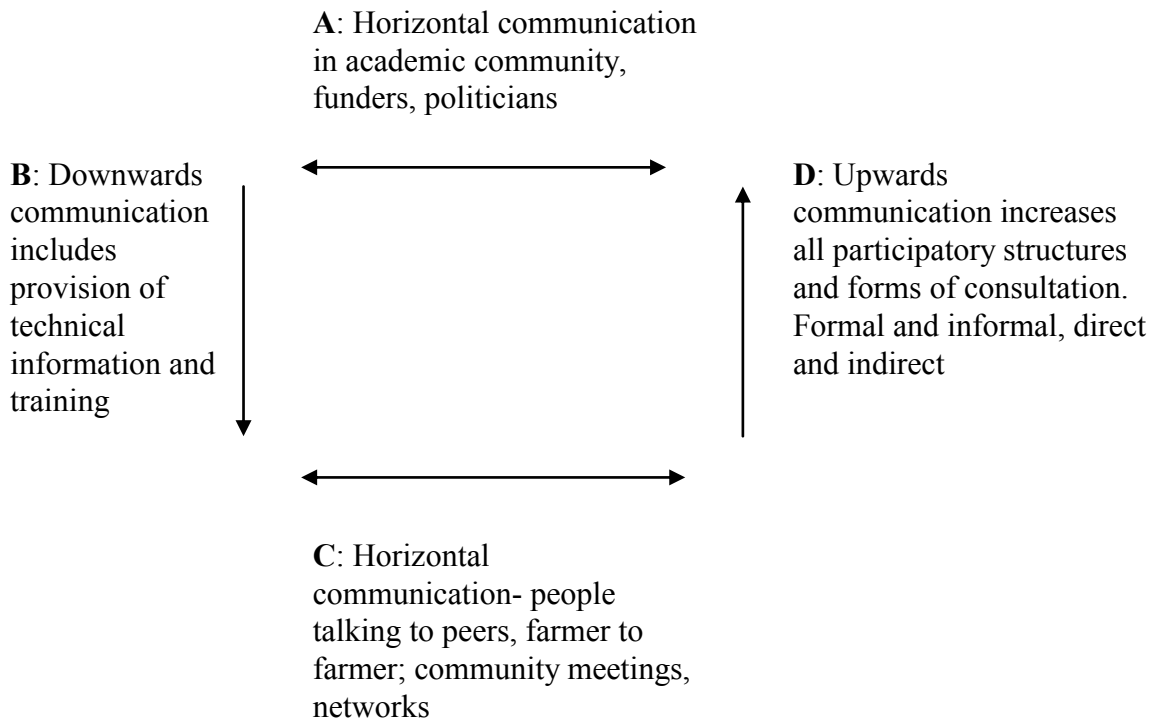
The number of publications on dissemination issues relating to the development sector is increasing but still, other disciplines provide valuable insights on this topic. For this reason, several electronic databases were used to provide a multidisciplinary perspective. Among the most useful were BIDS Web of Science (SSCI and A&HCI), ERIC, LISA Plus and Compendex. In addition to these, ingenta, Article First, NetFirst and OCLC Proceedings were used, as well as organisational databases of resources such as that provided by IDRC, and web-based metasearch engines such as surfwax.com. The publications consulted were mainly from the fields of development, health care and information science.

2.0 Information flow

Burke's model (1999) of communications flow recognises the need to consider horizontal

communication between peer groups at both grass roots and decision-making levels, as well as the upwards and downwards communication routes which allow the flow of information between these two groups.

Figure 1: Communications Flow



From Burke, A (1999)

This model raises different concerns about the status of indigenous knowledge that are beyond the remit of this literature review. It does, however, suggest that boundaries exist between groups A and C which may be crossed by exploiting alternative methods of communication which are used successfully in low income countries. These offer potential means to increase the range and output of dissemination generated in the North (Heeks 1999). Conversely, over reliance on information communication technology (ICT) may work against this goal.

Clearly, communication of information, or the lack of it, is a potential vehicle for maintaining power (Zadek, 1992, Yankah, 1999, Alemna 1999). There are many examples of the ways in which dissemination media function as forms of gatekeeping, effectively controlling and restricting access to information:

- Scholars in southern countries are excluded from academic process due to:

‘the domination of global academic discourse and publishing by Eurocentric standards; the subsumption of local intellectual paradigms under received western hegemonies; the monopolistic control of the center of academic authority; and subsequently, the marginalisation of other intellectuals and their local academic agendas’ (Yankah 1999, p13).

- Part of this process is the reliance on academic journals (in paper and digital formats) which disadvantages southern scholars (Arunachalam, 1998, 1999, Zadek, 1992).

- Sturges (1999) identifies a range of constraints (the capacity to acquire, organise and repackage information) on the use of grey literature for decision making in developing countries, which reduces the degree of social ‘intelligence’. Information on women in Africa mainly appears in grey literature and is therefore seldom published (Mbambo 1999).
- Affected stakeholders were not fully included in the development process of the Bohol-Cebu water supply project by its proponents as they were bypassed by the flow of information and communication (Fisher and Urich, 1999).

For dissemination of research to be effective and to meet its target audience, researchers must take steps to facilitate the operation of Burke’s model, to ensure that communication pathways exist and to enable participation by local and institutional level target audiences. The next stage of dissemination to the grassroots users depends on effective dissemination at this level.

2.1 Traditional information channels

It is clear that studies into the nature, use and value of information (e.g. Hill 1999) are often written from the perspective of industrialised countries. McConnell (1995) stresses that this does not fit with southern traditions of information transfer and existing infrastructures. These ‘organic information systems’ may be the prime information sources for the poor, as they are likely to conform to more of the user-focused criteria listed than, say, ICTs (Heeks 1999, pp.8-9). We should remember that the concept of ‘information poverty’ (Arunachalam, 1998) is perhaps misleading as it assumes, once again, that ICT is a prerequisite of information transfer.

Norrish and Lawrence’s case studies (1997) in the Philippines and India of the ways in which farmers in low income countries gain information about sustainable agriculture offer useful insights into traditional information channels. These also reflect the initial findings of ITDG’s ongoing study of ‘Knowledge and Information Systems for Improved Livelihoods’. Models of communication presented by Norrish and Lawrence show a variety of complex communication channels extending across the boundaries of national, district and community level organisations. However, the reach of these channels is limited, characterised by a predominantly top-down flow of information, with information generated at national level being too general, prescriptive and largely irrelevant to the needs and circumstances of individual farmers. The mass media (radio and TV), where available, is limited in its content and the over reliance on printed materials by government extension and research organisations results in information which cannot be used by the illiterate rural poor. In general, the most useful information is the result of informal face-to-face communication with friends and relatives.

The following table offers a comparison of Southern and Northern information systems:

Table 1: Northern and Southern information systems		
Information system	South	North
Individual communication	Face-to-face interaction between individuals	Face-to-face interaction between individuals
	Word of mouth	Email Word of mouth
Group communication	Community meetings	Academic journals
	Community theatre	Professional journals

	Experiential learning	Sector journals
	Training	Email
	Demonstration	E-conferences
	Exchange visits	Training
		Exchange visits
		Conferences
Mass communication	Posters	National press
	National radio	Internet
	TV	TV
	Local press	National radio
	National press	
	Local radio	

The key differences between Southern and Northern information systems are:

- a greater reliance in the North on technological communication methods;
- communication on every level is generally easier in the North than in the South as more stable mechanisms are in place to facilitate it;
- it is easier to target specific groups in the North such as professional associations as there are recognised, widely used channels of information use;
- mass communication is successful in both contexts but has a far wider reach in the North than in the South because of higher coverage rates;
- less formalised methods of communication are common and proven to be effective in the South.

There are several implications for dissemination that can be drawn from this. Firstly, researchers generating information in the North should communicate to the widest possible audiences extending into low-income countries. Traditional communication methods used in the South such as community-based activities will help facilitate this and should be considered by researchers even if they have not employed such methods in previous work. The role of intermediaries to assist in implementing these methods may be key in this (see Section 3.2). There is substantial evidence of the effectiveness of traditional communication methods proving that, as Hill (1999) contends ‘at the individual level, IT-poor does not yet mean information-poor’ (p.142).

These are examples of ways in which development issues are successfully promoted by traditional means:

- Radio has a positive impact on agricultural development. Radio Listening Clubs (RLC) in rural Zimbabwe allow communities to analyse their problems and strengths (Mhonda and Eddington, 1997). This initiative overcomes the lack of household radios and the problem of bias towards urban priorities seen in conventional print and broadcast media. The Radio Nederland Training Centre (RNTC 2000) is planning to run Dramatisation of Information Courses for programme-makers working in radio and television later this year, using dramatic techniques and dramatised formats to raise public awareness and change attitudes on environmental and energy issues. Taxi drivers play a key role in both canvassing public opinion and in disseminating information about the IT Peru building Reconstruction Plan in Alto Mayo (Maskrey, 1992).

- There are examples of the ways in which women are tape recording their experiences and local knowledge to contribute to international radio as part of the Feminist International Radio Endeavour (FIRE) based in Costa Rica (Mastrangelo, Sanders and Singh 1992).
- Women in Bangladesh perform a key role in information transfer, from beggar women who gather information while travelling through a community, to married women who exercise their right to return to the family home periodically on a 'nairobi'. Both of these are means of absorbing and transferring information. The example given by Huq (1992) is of the way in which flood preparations in a particular village were based on lessons learned by another village, transmitted by a woman returning from a nairobi.
- Although Mutshewa (1999) advocates a combination of dissemination media, he maintains that the environmental information needs of communities in rural Botswana can be met by tribal meetings.

An acknowledgement of the participatory nature of dissemination requires researchers to promote the full cycle of communication flow already described. The traditional information channels listed should be exploited to facilitate feedback from user communities, maximise the reach of dissemination activities to these groups and in this way to complete the cycle.

2.2 The role of ICT to dissemination and development

The development of the so-called 'information society' suggests that the need for information is something that has occurred recently. Furthermore, implicit in the term is the concept of information and communication technology (ICT¹), now seen as inevitable and fundamental to the dissemination of information in industrialised society (Hill 1999). This section considers the role and usefulness of ICTs as a possible way to increase dissemination.

We are not yet a *global* information society as the growth in access to information technologies is occurring at very different rates around the world. Nevertheless, there is great emphasis on ICT as an important tool for the alleviation of world poverty, for example:

'This new technology greatly facilitates the acquisition and absorption of knowledge, offering developing countries unprecedented opportunities to enhance educational systems, improve policy formation and execution, and widen the range of opportunities for business and the poor' (World Bank 1998, p.9).

This viewpoint is rejected by Heeks (1999) as what he calls 'the contemporary ICT fetish' (p.12) which, he argues, sees technology as a form of development in itself. His study into the role of ICT in alleviating poverty by the development of small and micro-enterprises suggests that the prerequisites for information transmission are resources (both 'overt' and 'social'), as well as the relevant data to be transferred. Each of these has to be satisfied in order for the poor to access and use ICT.

The provision of these environmental components has a long way to go. The Economic Commission for Africa (ECA 1999) outline the powerful 'economic, social, political, technical and infrastructure constraints' (p.5) to African Internet access, which result in an average network density of less than 100 times the global average. Figures for developing countries world

¹ Heeks (1999) offers a definition of ICT as the 'electronic means of capturing, processing, storing, and communicating information' (p.3).

wide taken from the 1998 United Nations Development Programme (UNDP) Report (reported in Arunachalam, 1999) show that 0.4 per cent of the population have a telephone line, 0.7 per cent have a computer and 0.05 per cent have Internet access. Added to this, is the huge disparity in the cost of phone connections in Africa (20 per cent of GDP) compared to those in high-income countries (one per cent), the high 'luxury' import taxes incurred on computers and long distance call charges to overseas Internet service providers (Bentsi-Enchill 1999).

The issue is not simply one of channelling funding into ICT expansion. Consequent negative impacts of this, associated with 'job losses, increased stress, reduced flexibility, centralised control and surveillance, and impoverished communications' (p.14) have been identified (Heeks, 1999), as the investment required to significantly improve access would mean reductions in expenditure in other areas of development. Furthermore, experience has shown that following external set-up funding, the sustainability of ICTs can become problematic in terms of the cost and maintenance of an adequate supporting infrastructure (Kargbo, 2000). Forms of technology-based communication are, generally, a supplement to face-to-face and print media (Sturges 1995).

However, there are powerful examples of ways in which new technology is playing an important developmental role:

- An online local database provides a dual information resource about local facilities and outside business opportunities to the Alexandra township community (Heeks, 1999, citing Benjamin, 1999).
- Grameen Phone intends to lease at least one cellphone to every village in Bangladesh by 2004 as a support for small business, through the Village Pay Phone (VPP) programme (Haque, 1998).
- The M.S. Swaminathan Research Foundation (MSSRF, 2000) provides an electronic network of three local sub centres which provides locally specific information on such issues as health care, entitlement, market and transport, as well as a data and fax transmission service (Arunachalam, 1999).
- Small business communication 'telecentres' in Ghana are offering community-based services including shared ICT access for individual, social and economic advancement (Owen and Darkwa, 2000).
- Electronic conferencing has successfully facilitated the worldwide exchange of information (Ali and Saywell 1999).
- Several initiatives were launched at the African development Forum including Schoolnet Africa (Internet connection in schools) and NGONet Africa (a network of more than 40 organisations, using ICT for development) (Bentsi-Enchill 1999).

These initiatives put into practice the principles of community integration, using locally relevant and generated information presented in appropriate language formats (Norrish and Lawrence 1997).

However, the problems surrounding ICT and development are more pervasive than the successes.

Although ICT has been identified as a potentially useful means of providing an international voice to the poor (Heeks, 1999), the proportion of information generated by the communities concerned is negligible (Sturges 1995, Norrish and Lawrence 1997). Africa contributes only 0.4 per cent of the total global content, reducing to 0.02 per cent if South Africa is excluded (ECA 1999, p.1). Grants are being made available by La Francophonie for training in web-based content development and the ECA's Development Information Services division are aware of the need to extend training to achieve a greater proportion of African content. Partly to address this imbalance, Norrish, Lloyd-Morgan and Myers (1999) suggests that the stakeholder is involved at all stages of the research programme, from its inception, and throughout the project, the match of project and people is reviewed and adjustments made accordingly. The benefits of such a 'bottom up' (Arunachalam, 1999) approach are far-reaching:

'a greater sense of partnership, increased credibility, country specific policy based on local knowledge and enhanced ownership and easier adoption of recommendations' (Norrish, Lloyd-Morgan and Myers 1999 p.20).

This is much more likely to ensure that a project is demand driven. It also guards against the influence of 'cultural and ethnocentric biases' (National Centre for the Dissemination of Disability Research (NCDDR), 2000 p.3) which can compromise objectivity.

A critical appraisal and training initiative 'Leading the Edge: Engaging Ontario' (OCIC 2000), funded through the NGO Project Facility Fund of the Canadian International Development Agency (CIDA), considers some of the issues arising from the introduction of the Internet as a tool for NGO's and other professionals working in the field of international development and global education. The formative phase of the project involved a 'needs and issues' assessment of their members which found that most groups reported having the functional ability with software and hardware, using the Internet daily, but that training and maintenance were low priorities. Following on from this, critical appraisal workshops identified the Internet as offering potential benefits to NGO's via increased networking, international connections and outreach and fundraising. However, its random appropriation can create new gaps within and between communities; therefore it must be seen as a tool for furthering local objectives rather than a replacement means of communication (OCIC 2000, Heeks 1999). The project recommends that NGO's improve their technical proficiency, but use a variety of communication tools that simultaneously promote alternative or traditional communication.

What does all this mean for the dissemination of development issues? While recognising the potential usefulness of ICT's, we must also acknowledge the significance of environmental conditions (social, cultural, economic, technical and infrastructural) which may limit this potential or render ICT virtually useless. The following section examines what it is that different groups of information users require for information to be effective.

3.0 Recognising the context of the user

Many studies have identified the importance of understanding the 'user context' of any dissemination activity. The NCDDR studies assume that the user is an individual and therefore 'research outcomes must address the resources, needs, concerns, and circumstances of a potential user's daily life' (NCDDR, 2000 p.5). Whether development-related information is aimed directly at poor users or at intermediaries and members of NGO's, GO's and other development organisations, the need remains to choose material of appropriate content presented in suitable

formats which should then be sent via useable media to the audiences targeted. Getting this right demands a review of the current state of need and the ‘information use environments’ (IUEs) (Menou, 1993) which might affect information transfer. An additional profile in the form of the users’ “knowledge activating attributes” (Menou 2000, p.5) is a pre-requisite, which informs researchers about structural and situational factors influencing users’ effective use of disseminated information. Chetley (2000) points out that information is unlikely to be acted upon unless an interaction process is in place that encourages and stimulates the use of materials. He cites the example of a WHO study in which end users reviewed materials. They were then more likely to use and recommend them to others.

Haravu and Rajan (1996) provide a valuable although generalised analysis of the IUEs of semi-arid tropical (SAT) countries in Africa, Asia and Latin America, based on visits to several countries in East, South and West Africa and South and South-East Asia. The broad characteristics they identify are:

- the lack of formal mechanisms of external information transfer such as libraries and information centres;
- the resource and skill deficiencies of formal national information mechanisms which limit access to internally generated information;
- inadequate access to current literature in academic institutions;
- inadequate library stock and lack of document delivery options;
- inadequate linkages with external information sources which could compensate for limited internal research capabilities.

These factors are potential threats to the effective functioning of the ICT information chain. Heeks (1999) groups IUEs into the following categories:

- ‘*overt resources* (money, skills, technical infrastructure)’
- ‘*embedded/social resources* (trust, motivation, knowledge, power)’ and
- ‘*relevant raw data*’.

Overt resources are relatively easy to measure as they include factors such as network access, adequate infrastructural, technical and financial support, and the necessary users skills for successful access and use. Testing for social resources is more complex as this covers the proximity of the information source to the users and the degree to which it shares their cultural, political and economic assumptions and the degree of user knowledge that is required to assess and apply information. Heeks maintains that none of these are insurmountable barriers to effective dissemination. However, dissemination impact cannot be evaluated without taking these factors into account.

This section presents a checklist of questions which should guide user needs assessment and help ensure that the message and its medium is tailored to fit the context of the user. User focused criteria can be divided into the following categories (after Westbrook and Boethel, 1997, NCDDR 2000): users, source, content and medium. The questions to consider are:

Users

- What it is that the poor or those representing/assisting them need to know? (Westbrook and Boethel, 1997)
- Is the information strictly relevant to the local context (Heeks, 1999a) and is it perceived by

potential users to be relevant (Westbrook and Boethel, 1997, NCDDR 2000)?

- What resources (skills, knowledge, money) do users need to make use of that information? (Heeks 1999)
- To what extent are users ready to change? (NCDDR 2000)
- What is the most appropriate information format e.g. the length of document, written style and language? (Westbrook and Boethel, 1997, Alemna 1999)
- What is the preferred vehicle for dissemination, based on an understanding of locally available options? (Westbrook and Boethel, 1997)
- Is the level of publicity adequate to ensure awareness of the information by users? (Hénault, 1991)

Source

(NB. the importance of the source of new information is often greater than the information disseminated - NCDDR 2000).

- Is the source perceived to be competent, experienced and having credible motives? (Westbrook and Boethel, 1997, NCDDR 2000)
- What is its relationship to other trusted sources? (NCDDR 2000)
- Is it sensitive to the concerns of the users? (Westbrook and Boethel, 1997, NCDDR 2000)
- Is it oriented towards dissemination and knowledge use? (NCDDR 2000)
- Has appropriate use been made of intermediaries with established relationships with intended audiences? (NCDDR 2000)

Content

- Is it credible in terms of the methodology and outcomes? (Westbrook and Boethel, 1997)
- Is it comprehensive? (Westbrook and Boethel, 1997)
- Is it comprehensible to users? (Westbrook and Boethel, 1997)
- Is there a check for possible cultural and ethnocentric bias on the part of the disseminator? (NCDDR 2000)
- Is it compatible with users' beliefs and needs? (NCDDR 2000)
- Is it presented in an appropriate language? (NCDDR 2000)
- Is the written style clear, jargon-free, with full definitions of terms? (NCDDR 2000)
- Is the information necessary? (McGrath, 1999);
- Is the information accurate and reliable? (McGrath, 1999);
- Does the information relate to key issues? (McGrath, 1999);
- Can the information be more usefully presented in digest form? (McGrath, 1999);

Medium

- Is it accessible to intended users? (NCDDR 2000)
- Are there alternative and/or additional media which would better facilitate accessibility and comprehension?
- Is it cost-effective? (Westbrook and Boethel, 1997)
- Is the information package easy to use, clear and attractive? (Westbrook and Boethel, 1997)
- Is personal interaction a possibility? (NCDDR, 2000, McGrath, 1999)
- Is the medium simple? (McGrath, 1999)

Are electronic media supplemented by paper-based versions? (McGrath, 1999)

These are general issues which apply to all user groups. A survey of DFID staff user requirements and preferences (McGrath 1999) raises more specific needs:

- Paper copy is preferred for lengthy documents as it is easier to deal with unsolicited mail in this format;
- Snail-mail is preferred for lengthy documents;
- Electronic methods are generally popular, provided access is unproblematic;
- Internet access is very variable (from 15 to 94% of the total population surveyed). Those who have access experienced difficulties relating to speed and reliability. Attitudes towards the potential usefulness of Internet dissemination are favourable (presumably amongst those who are receptive to or experienced in using new media) with possible popular services including a list of relevant web sites and document delivery;
- Email (e.g. menu service, listservers, forums, updates, digests) is useful but attachments should be simple;
- The DFID intranet facility is patchy, although this was a popular option for those who have access to it;
- Full-text document options are desirable;
- Searchable (by topic or area) dissemination options are popular.

It may not be possible to extrapolate from this model to the information needs of other agencies since they may have very different communication packages, however, it does indicate some general trends. It appears that electronic methods are popular provided there are no access difficulties to the technology. Generally, condensed knowledge is more useful than lengthy documents, due to pressure of time and information overload.

4.0 Evaluating the impact of dissemination pathways

The results of careful planning and implementation of dissemination should be continually reviewed. Dissemination impact is an issue that warrants attention for the reasons set out by McConnell (1999):

- potential information users may make greater use of their information resources if the benefits can be demonstrated clearly;
- information system design could incorporate what is learned about inputs, outputs and outcomes;
- sustainability of projects is increased by an appreciation of the returns on investment.

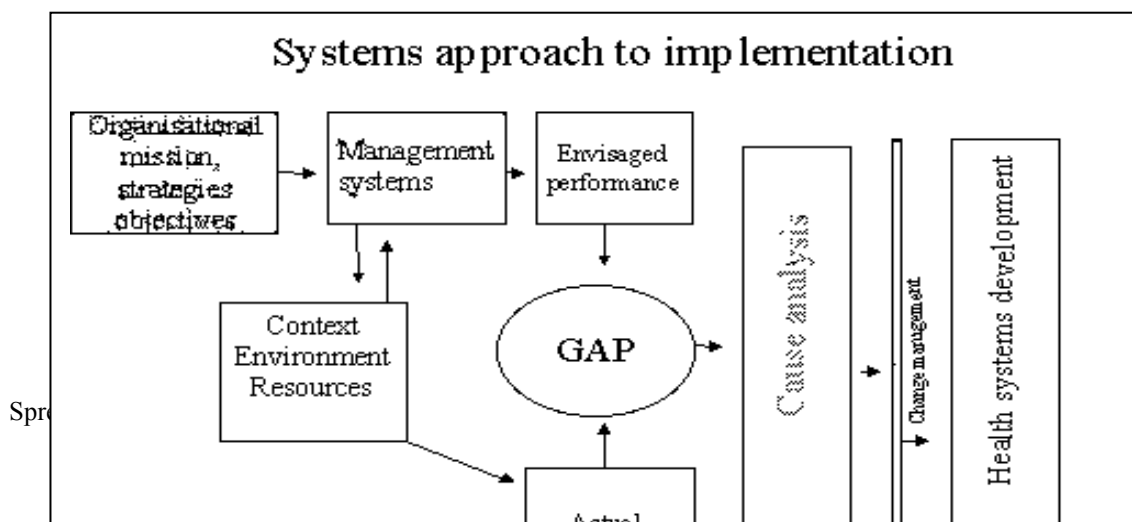
As already outlined, the construction of a user profile based on information use environments and knowledge activating attributes (see section 2.0) should be part of the preliminary framework. Another aspect of the preliminary phase should be a base line study which includes 'a review of the community's past and current performances with regard to the key issues earmarked for the impact assessment' (Menou 2000, p.5) to indicate the nature and degree of change. Difficulties may arise if the initial aims and concerns of the project are superseded by alternative priorities along the way. In addition, the inclusion of a control group that is not exposed to the dissemination process is a requirement (Menou 2000).

There are several principles of dissemination monitoring and evaluation that recur in the literature:

- Ideally, impact assessment should be carried out by an independent and external body, rather than by the information provider (Menou 2000).
- Monitoring activities, including monitoring of dissemination, should be built into the design framework of any activity (Shordt 2000, Menou 1993, NCDDR 1997, Max Locke Centre, 1998).
- Menou (2000) is critical of studies such as the Semi-Arid Tropical Crops Information Service (SATCRIS) because their evaluation takes place shortly after the expected impact of the information. He suggests that the time needed to assess an information impact accurately should be at least four to five years from the time of dissemination. Impact studies should also be longitudinal and long term (Menou 2000), and ongoing, therefore requiring regular feedback from the receivers to senders (Menou, 1993).
- NCDDR (1997) distinguish between four possible types of evaluation; formative (occurs at the design stage and is aimed at potential users); impact (concerns long-term results and actual changes); outcome (measures effects on target audiences); and process (of the initial stages of an activity and its implementation). Ideally, evaluation should take place on all these levels.
- Those with a vested interest in the issue should have input into the monitoring process, i.e. it should be user-driven, which may mean monitoring impact on the 'lowest' level users (Shordt 2000, Menou 1993).
- The target user-community depends on whether the evaluation adopts a service-centred or a user-centred approach. Haravu and Rajan (1996) take a service-centred approach and include in their sample researchers, teachers, postgraduate and research students, government officers, NGO officers and private sector staff.
- Saywell and Cotton (1999) have identified the difficulty of measuring the impact of the dissemination pathway rather than the impact of the research or activity. Furthermore, the complexity of establishing a direct correlation between an information service and a development goal is due to the need to disentangle the effect of information from the many other contributory factors (Haravu and Rajan, 1996). A similar point is made by Scott (1999) who identifies the 'indirect and often intangible nature of many knowledge flows' (p.11).
- As an overarching principle, monitoring information should be gathered selectively, about 'key concerns, problems, (and) bottlenecks' (Shordt, 2000, p.4).

The 'systemic approach' is a useful model for monitoring and evaluation activities. This is currently being tested within WHO education and training programmes (Stilwell 2000). This approach reflects an understanding of the way that change in one part of the system will influence and be influenced by change in other parts of the same system. Figure 2 shows the project design for increasing injection safety by using an information tool kit. The toolkit will be prepared over the next year in partnership with the countries in which it will be used; changes to it and the information included will be suggested by partner feedback.

Figure 2 Systems Approach to Implementation



The main features of this model could be applied to other dissemination and implementation programmes. Assessment and evaluation are built into a continuous cycle. Evaluation therefore re-informs cause identification and analysis and change.

4.1 Identifying indicators of dissemination impact

Central to these monitoring activities, is the identification of impact indicators which are needed ‘to determine the degree to which a project or activity succeeds or fails in meeting stated general needs and objectives’ (Menou 1993, p.91). These indicators will, of course, vary according to the nature of the project and its intended effects, but they need to be identified at the design stage of the project (Gosling and Edwards 1998). At present there is little distinction made in the literature between the impact of information systems and services and the impact of information, and it may be that the only way to measure the impact of the former is by using indicators of the latter. Menou (2000) predicts that this distinction will need to be made more clearly in future with the increasing variety of dissemination methods.

The NCDDR (1996) study provides a starting point for identifying impact indicators. In the case of dissemination, it states that the overall goal should be ‘utilisation’ (p.11), meaning that research must be ‘critically and thoroughly digested’ (p.11) and the new information absorbed into an individual’s understanding (even if this results in a rejection of the information disseminated). Similarly, Heeks (1999) identifies the main indicators of value (and therefore impact) as the affects on decision-making and action. However, measuring differences in decision-making capacities and the degree of assimilation of information into an individual’s understanding is not easily quantifiable. Furthermore, Menou (2000) argues that the outcome of actions based on information is an effect rather than an impact, because there are many other potential influencing factors on actions. He defines impact as “the changes in the ability of people to cope with their problems as a result of the use of information” (2000, p.6).

From these slightly differing definitions, it is sensible to extrapolate the following principles:

- effective dissemination informs an individual’s position – this is how it is ‘used’
- from this position, an individual acts and reacts in certain ways
- the difference between the way an individual acts before and after exposure to disseminated information is the indicator of that dissemination’s impact.

The two commonly applied models that might usefully act as benchmarks to identified indicators are ‘SMART’ (Gosling and Edwards 1998) and ‘SPICED’ (Roche 1999). SMART indicators should conform to the following properties:

- be **S**pecific to the intended changes, rather than measuring external forces
- be **M**easurable and unambiguous

- be **A**ttainable or achievable by the project
- be **R**elevant to the project and cost effective to collect
- be **T**imebound (specify anticipated time limits).

SPICED indicators and their assessment should be:

- **S**ubjective in that informants are uniquely placed to offer insight based on their experience
- **P**articipatory- involving these informants
- **I**nterpreted or explained by others to provide an understanding of the local context in which they occur
- **C**ross-checked against other indicators, informants and methods
- **E**mpowering to affected groups
- **D**iverse in nature and measured from a variety of informant groups.

Table 2 shows a range of impact assessment indicators, identified in the literature. Although the list is not exhaustive, it is perhaps, representative of the literature reviewed. Most of them would be verified by qualitative methods or by a combination of approaches. Many of the indicators included do not easily conform to the SMART indicators, for example, differences in time spent may be the result of a combination of factors, including exposure to new information but also reflecting length of service in a particular post. Indicators such as ‘increased confidence’ may be difficult to put a time limit on, as people assimilate information at different rates.

The qualitative indicators in Table 2 are seen to be far more robust when assessed according to the SPICED criteria, as this model emphasises the importance of qualitative and participatory methods of assessment, in which there is room for subjectivity and interpretation. This allows both behavioural and perceptual changes to be monitored, based on self-assessment (Lia-Hoaberg et al, 1999), which would be difficult to capture quantitatively or by using proxy measures of impact.

Table 2. Indicators of dissemination impact

INDICATOR	Means of verification	Conforms to SMART	Conforms to SPICED
Difference in time spent carrying out relevant tasks before and after exposure to information (Thorngate 1995;Menou 1993;Haravu and Rajan 1996)	Qualitative	No	Yes
Reduction in uncertainty and consequent increase in predictive accuracy (Thorngate 1995)	Qualitative	No	Yes
Knowledge of topic updated (Haravu and Rajan 1996)	Qualitative	Yes	Yes
Increased confidence as a researcher/teacher/administrator (Haravu and Rajan 1996)	Qualitative	No	Yes
Better interactions with colleagues (Haravu and Rajan 1996)	Qualitative	No	Yes
Helped resolve difficulties in work (Haravu and Rajan 1996)	Qualitative	No	Yes
Capability for problem solving (Haravu and Rajan 1996)	Qualitative	Yes	Yes
Add to available literature (Haravu and Rajan 1996)	Qualitative	Yes	Yes
Help in decision making (Haravu and Rajan 1996)	Qualitative	No	Yes
Development of human resources (Haravu and Rajan 1996)	Qualitative	No	Yes
Increased demand for information from Semi-Arid Tropics researchers (Haravu and Rajan 1996)	Quantitative	Yes	Yes
Existence of products (Haravu and Rajan 1996)	Quantitative	Yes	Yes
Improved productivity (Menou 1993)	Qualitative and quantitative	Yes	Yes
Improved quality of work (Menou 1993; Haravu and Rajan 1996)	Qualitative	Yes	Yes
Improved timeliness of work (Menou 1993)	Quantitative	Yes	Yes
Value derived (Menou 1993)	Qualitative and quantitative	No	Yes
Increase in formal information use (libraries, databases, newspapers etc) (Vaughan and Tague-Sutcliffe 1996)	Qualitative and quantitative	Yes	Yes
Increase in informal information use (friends, colleagues) (Vaughan and Tague-Sutcliffe 1996)	Qualitative	No	Yes

4.2 Methodologies to assess the impact of dissemination pathways

Methods used in monitoring impact will vary depending on the indicators being used (NCDDR 1997). Table 3 represents those methods that have been identified in the literature. As already indicated, the range of possible methods span the quantitative/qualitative continuum.

The Health Information Forum (2000) decided on two broad categories of measurement for monitoring and evaluation activities. These were ‘Is the work or publication actually making a difference?’ and ‘Why do things happen or not happen - how can we understand the function of catalysts in making things happen?’ (p.7). Methods 1 to 4 in the above table will provide quantifiable information that may be important for reporting and justification purposes, in answer to the first question posed. They may be used over a large sample size. Methods 5 to 13 are part of an increasingly complex and time-consuming continuum of qualitative methods, which will record in depth lessons learned in answer to both questions, but generally over a smaller sample size.

4.3 The results of impact evaluation

Although Shordt (2000) identifies what she terms ‘a minor revolution’ in monitoring activities in the water and sanitation field, she finds evidence that information generated by monitoring processes is often not used to bring about change (supported by Scott, 1999). Often, results of monitoring and evaluation are only shared within organisations. HIF (2000) identify the reasons for this to be a lack of recognition by investigators of the value of results to outside organisations, and the predominant culture which does not share information.

It is important to clarify and agree with potential users how the results of any evaluation will be used (Gosling and Edwards 1998). This should outline the various methods and advocate the testing of new methods, together with details of the use to which they were put and any resultant modifications made to the dissemination process. Menou (2000) advocates the production of a detailed manual to disseminate results. Whatever the chosen format, NCDDR (1997) recommends including the following elements:

- the strengths and weaknesses of the dissemination process (HIF (2000) emphasise the need for honesty in reporting negative results to achieve progress);
- outcomes which can be attributed to the dissemination process;
- recommendations for change and modification to the dissemination process;
- the impact on target audiences;
- variations in impact on audiences according to variables of the group, content, context, medium and information source;
- recommendations for further action regarding the evaluation of impact of dissemination.

Suggested ways in which these might then be used, (outlined by Gosling and Edwards 1998) are:

- to provide a discussion framework for the further development of work
- to inform decisions
- to be the basis for broader strategies
- to be a model for subsequent review and evaluation activities
- to influence other collaborating organisations.

Table 3: Methods for assessing the impact of dissemination pathways

METHOD	COMMENT
1. 'Bean counting' (records of requests; distribution figures) (NCDDR 1997; Haravu and Rajan 1996)	<ul style="list-style-type: none"> • A basic form of tracking information. NCDDR promotes the use of electronic forms. The advantage is that all transactions can potentially be recorded. This method provides no insight into the use made of the information and its consequences (Health Information Forum 2000). • Scott (1999) rejects the idea of taking dissemination measures such as these as a proxy measure of impact; they should at least be supplemented by additional methods (e.g. user opinions) to provide a valuable triangulation of data for evaluation (Glaser and Strauss 1968).
2. Recording web site hits (NCDDR 1997)	<ul style="list-style-type: none"> • This is not a totally reliable method as a web site hit does not necessarily represent an incidence of use by a single user. It does, however, indicate increases and decreases in web site traffic.
3. Budget expenditure tracking (NCDDR 1997)	<ul style="list-style-type: none"> • Impact may be reflected in savings made due to dissemination output. This may be in terms of time saved. Not all impacts can be easily quantified as a monetary value, for example, additional information may result in greater levels of skill and a higher quality output but may lead to no timesavings.
4. Citation analysis (Haravu and Rajan 1996)	<ul style="list-style-type: none"> • There are strong arguments both for (Broadus, R.N. 1985; Kelland, J.L and Young, A.P. 1998) and against (Line, M.B. 1985; MacRoberts, M.H. and MacRoberts, B.R.1996) the use of citation frequencies as an indicator of document use or value.
5. Documentation of target audience changes (in press) (NCDDR 1997)	<ul style="list-style-type: none"> • This relies on secondary sources and external agendas and interpretations of impact that may not address the main areas of concern.
6. Feedback cards included with materials (NCDDR 1997)	<ul style="list-style-type: none"> • This method allows brief feedback. It relies on action by the receiver to return the card, therefore response rates are poor.
7. Follow up telephone calls (NCDDR 1997)	<ul style="list-style-type: none"> • This is similar to feedback cards but action is instigated by the sender, so a higher level of response is expected. The depth of feedback varies depending on the nature of the survey.
8. Questionnaire to all recipients (Haravu and Rajan 1996)	<ul style="list-style-type: none"> • This relies on action by the receiver to send back the card. Response rates are poor. • Several versions of the questionnaire may be more useful than a single, generic version.
9. Secret ballot (Shaw and Jawo 1999)	<ul style="list-style-type: none"> • The Stepping Stones Gambia programme used secret ballots to assess changes in

	behaviour and knowledge following an HIV awareness campaign. They found that respondents did not always understand that a negative response to a question could be correct and was permissible. These may be particularly useful if the nature of the information is sensitive or not usually discussed.
10. Structured questionnaires/ interviews (Haravu and Rajan 1996)	<ul style="list-style-type: none"> • A stratified sample should be used, recognising the country, subject and institution. • Questions specific to specialist groups are required.
11. Unstructured interviews (Adams and Wood 1998; Haravu and Rajan 1996, (Shaw and Jawo 1999)	<ul style="list-style-type: none"> • A stratified sample should be used, recognising the country, subject and institution. Access to rich, specific and anecdotal evidence is possible. • Interviews are more likely than questionnaires to uncover criticisms.
12. Focus groups (NCDDR 1997, (Shaw and Jawo 1999)	<ul style="list-style-type: none"> • These should comprise individuals who reflect the characteristics of the target audience. Access to rich, specific and anecdotal evidence is possible.
13. Case study analysis (Stephens, 1998)	<ul style="list-style-type: none"> • Within this approach, a range of methods may be used such as focused interviews and policy document analysis.

Knowledge about the impact of dissemination on users can also be used to help create learning environments and to find practical applications for resource materials (HIF 2000). The HIF experience is that impact analysis also assists understanding of the cost-benefits of developing peripheral dissemination and implementation support for information resources. This may be important when seeking funds for resource and information development and implementation.

5.0 Summary

- There is a growing body of literature on the theme of dissemination and its impact on development. The principles of dissemination are widely documented, reflecting the increasing importance attached to information transfer within all levels of development. It is accepted that the process of dissemination should be interactive, allowing feedback from all stakeholders in the programme according to a cyclical model of communications flow.
- Increased awareness of the need and possibilities for dissemination appears to correspond to developments in the field of ICT. There is vigorous debate within the development community about the role and usefulness of ICT to meet the needs of knowledge transfer. This question is unresolved in the literature, but there is a degree of consensus that it should not replace alternative and traditional methods. While ICT is promoted by organisations such as the African Development Forum, it is also recognised that there are serious limitations to dissemination that relies solely on technological media, due to infrastructural, cultural and economic factors. There is also an imbalance between the roles of information consumer and producer played by those in low and middle-income countries. Clearly, ICT's such as the Internet offer great potential in this area. However, grossly inequitable access to such technologies in low-income countries and in certain sectors within them requires duplication of information in formats that are proven to be effective.
- Communication methods that have a track record of success in low-income countries offer important opportunities to reach users furthest away from the point of information generation. The literature offers very little firm direction as to how the research community might proceed with this. Most of the examples of using traditional methods of communication do not have a wider dissemination brief and less likely to be initiated by parties external to the communities. Researchers need to think as widely and creatively as possible about the ways in which these channels might be used to spread their message. The role of intermediaries is an important consideration.
- Decisions about which dissemination methods to use require a clear understanding of the target audiences' needs, skills and resources both to successfully receive information and to 'use' it. The checklist of questions about the user, source, content and medium of dissemination provides a provisional tool kit to assess these factors. This information can then inform decisions made about which dissemination pathways to follow.
- There is significantly less attention paid in the sector to evaluating dissemination and the pathways used, although this is a necessary task if dissemination is to be a holistic and interactive process. There is a range of both quantitative and qualitative methods for assessing the impact of dissemination pathways from request counts to focus groups. Decisions about which to choose depend on the nature of the research and the user groups' accessibility and willingness to participate. Defining the indicators of dissemination pathway impact is acknowledged as a difficult task as there may be no obvious and quantifiable factor

and the effect of the medium can be easily mistaken for the effect of the message. Once defined, they may be difficult to measure, if they rely on individual and subjective perceptions of utilisation and self-assessments of performance. This is a relatively new area of research and most of the related literature treats the evaluation of the research rather than the dissemination pathway. Work currently undertaken by Natural Resources International (NRI) and the Agricultural Extension and Rural Development Department, Reading University (AERDD) should provide valuable insight into these issues. More work is needed to inform decisions made about which pathways to use, how to assess their suitability in relation to the particular information use environments, and how to measure factors that indicate success.

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