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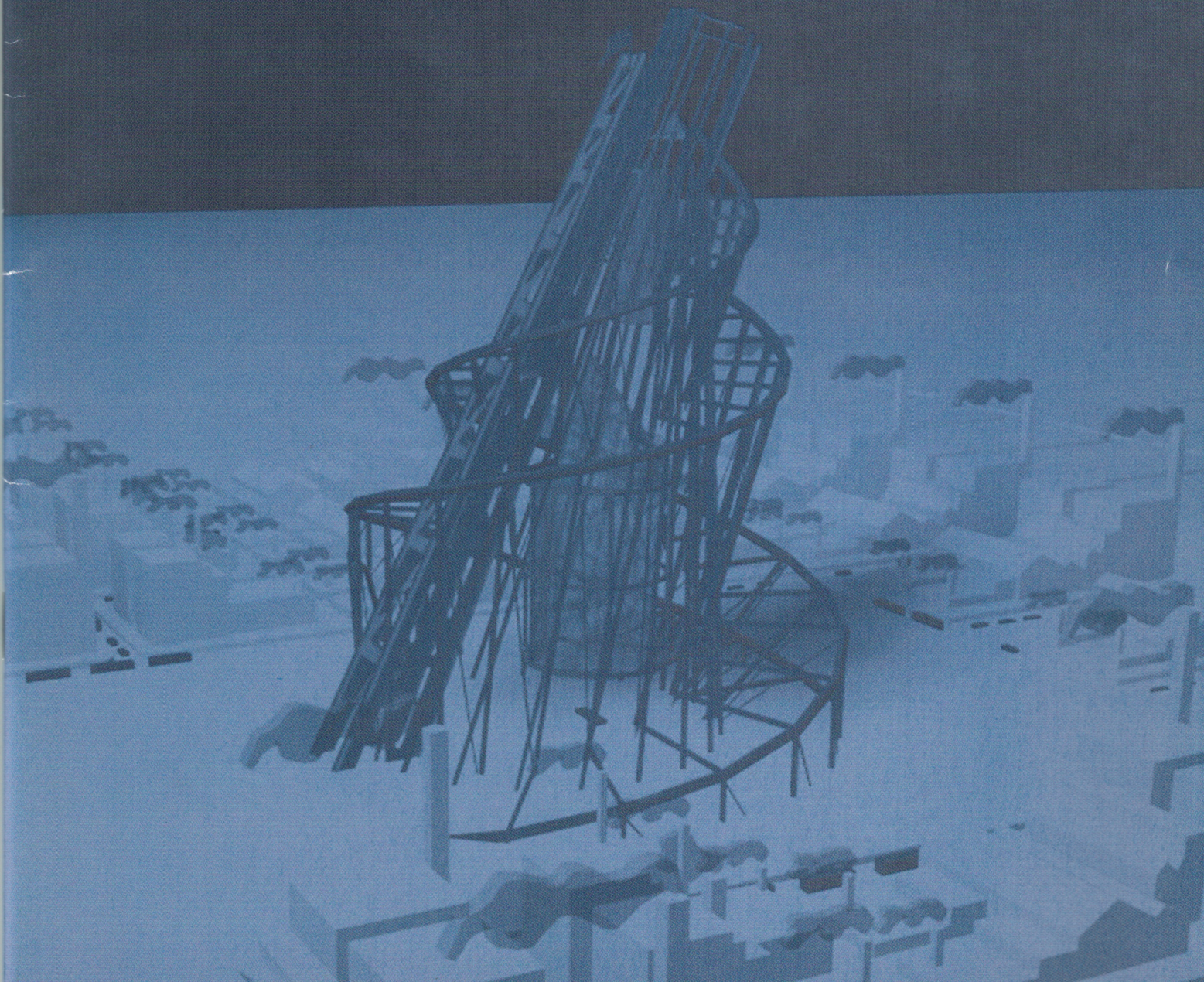
IMPACT OF ENVIRONMENTAL INFORMATION ON DECISION-MAKING PROCESSES AND THE ENVIRONMENT

Nickolai Denisov
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with contributions by

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UNEP/GRID-Arendal
Occasional paper 01 2001



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Foreword

Since its inception in 1989, GRID-Arendal has focused its efforts on bridging the gap between science and decision making processes by making easily understandable and scientifically credible environmental information available to decision makers and the public. A key objective is to provide information that would improve awareness and decision-making, and ultimately have a positive impact on the environment. After ten years of producing information products, supporting forty governments in preparing national state-of-the-environment reports, and being one of Europe's leading environmental information web sites, we realised that we still know little about the impact of this huge amount of information on the environment.

To better understand the impact of information on decision-making processes and the environment an internal programme was launched in 2000. This programme involves the Board members, senior management and staff of GRID-Arendal. A scientific advisory panel, composed of the Executive Director of the European Environment Agency, Mr Domingo Jiménez-Beltrán, the Executive Director of the International Institute for Environment and Development, Dr Nigel Cross, and Norwegian research journalist Mr Olav Høgetveit, was appointed to advise us in this process. The first panel meeting where a number of other international experts participated was held in June 2000.

This paper is the first output of this process. It is one in the series of GRID-Arendal Occasional Papers, initiated by the Board, that highlight key policy and operational issues arising from GRID-Arendal activities and considered to be of general interest. I believe that the current focus on the impact of information will help us and our partners better understand the relation between information and its impact. If we succeed, our information products will no doubt have a better impact and higher social value.

I take this opportunity to thank the authors, Dr Nickolai Denisov, Manager of our Central and Eastern European Programme and Coordinator for capacity-building and tools, Mr Leif Christoffersen, Chairman of our Board of Directors, and many GRID-Arendal staff members and external experts for their valuable inputs and comments.

I also invite interested readers to contact us with comments and inputs, as well as to work further with us to better understand the impact of information to the benefit of the environment.

Svein Tveitdal
Managing Director, UNEP/GRID-Arendal

Why focus on the **impact** of environmental information?

We live in a new information age and we are being told that our future will be significantly influenced by how we put information into good use. It is obvious that computer-based information technology has brought out vast amounts of new and readily available information. Internet services have further accelerated multiple demands for information in recent years.

- This has also been true for environmental information ■. With increasing public recognition of substantial environmental problems in the 1960s and 1970s came growing demands for reliable environmental information. When many governments established ministries of environment and environmental protection agencies in the 1970s, such development led to new demands for environmental information. Businesses became interested in environmental information when they realized that it might affect consumer behaviour, and when they had to comply with new legislation and environmental regulations.

The focus on environmental information did not just centre on government and business. In recent decades, civic society institutions (such as NGOs) have been the driving forces – on both the supply and the demand sides – of such information. Much of this attention has been geared to raising environmental awareness and to calling attention to specific environmental problems.

Environmental information for decision-making has long been on the international political agenda, but it gained special attention at the Earth Summit in Rio de Janeiro in 1992. The Rio Declaration contributed to renewed interest in this kind of application of environmental information. It pointed out (in principle 10) that:

As defined e.g. in the Aarhus Convention: ‘*Environmental information* means any information in written, visual, aural, electronic or any other material form on (a) The state of elements of the environment; (b) Factors... activities or measures, affecting or likely to affect the elements of the environment... and cost-benefit and other economic analyses and assumptions used in environmental decision-making; (c) The state of human health and safety, conditions of human life, cultural sites and built structures inasmuch as they are or may be affected by the state of the elements of the environment...’ (Convention... 1998)

“Environmental issues are best handled with the participation of all concerned citizens, at the relevant level. At the national level, each individual shall have appropriate access to information concerning the environment that is held by public authorities, including information on hazardous materials and activities in their communities, and the opportunity to participate in decision-making processes. States shall facilitate and encourage public awareness and participation by making information widely available.”

The Agenda 21 document agreed at the 1992 Earth Summit also points to the wider implications of environmental information in a larger sustainable development context:

“There is still a considerable lack of awareness of the interrelated nature of all human activities and the environment, due to inaccurate or insufficient information”

(Chapter 36: Promoting Education, Public Awareness and Training)

“In sustainable development, everyone is a user and provider of information considered in the broad sense. That includes data, information, appropriately packaged experience and knowledge. The need for information arises at all levels, from that of senior decision makers at the national and international levels to the grass-roots and individual levels... There already exists a wealth of data and information that could be used for the management of sustainable development. Finding the appropriate information at the required time and at the relevant scale of aggregation is a difficult task...”

(Chapter 40: Information for Decision-making)

Environmental information today is a significant contributor to improving the global environment and sustainable development, thus re-confirming the thesis that ‘knowledge is power’. It is quite appropriate for producers of environmental information, particularly for use in the public domain, to be interested in finding out how this instrument really works, and how to get maximum effect in the least costly way (‘time is money’, and often public money).

In the local, national and global levels, there is indeed a growing interest in finding answers to such questions as:

- To what extent is such work necessary?
- Is it effective?
- Is it cost-efficient?
- How can it be improved?

This paper, prepared by GRID-Arendal, Norway, explores some aspects of these questions and seeks to identify issues important in determining the kind of information that is most effective in bringing about educated and knowledge-based decisions. The basic idea behind the establishment of UNEP's global GRID-system in the 1980s was to build bridges between those who produce scientific knowledge and those who can use it in decision-making processes in the local, national and international levels.

Scientific results and science-based considerations need to be presented through products and services that make such knowledge more easily understandable to non-scientists, including the general public. Thereby they may improve the knowledge base for decision-making.

The impact of such information is often difficult to measure. There is the issue of time lags. There is also the recognition that decision-making is based on many different kinds of information. However, providers of environmental information, particularly in the public domain, need to have a clear picture of how information products can influence decision makers. GRID-Arendal has a vital interest in obtaining a good understanding of the users served by its information products and services, in finding out how information is being used, and in determining tangible results and tracing impact.

How does information create **impact**?

2.1 Different uses of information

Information helps make decisions. However the nature of these decisions and the role of information in decision-

making processes can vary considerably. The table below presents several cases, or contexts, in which environmental information is used:

Type of information	Context of use	User perspective (expectations)	Provider perspective (purpose)	Major indicator of success
1) Information for issuing a pollution permit	Environmental management framework; requirements are well formalised	Information formally acceptable and complete	Official mandate, profit or cost recovery	Decision completed
2) Evidence for court or a board of appeal	Environmental management framework; sources should be credible	Best available information to win the case	Profit, official mandate, special interests	Case decided
3) Public information in a library or on the web	Varying	Responding to specific questions or providing "food for thought".	Official mandate, cost-recovery, public service	Answers found or ideas generated
4) State-of-the environment report	Awareness raising, policy priorities	General picture and highlights	Official mandate, public service, special interests	Report is read, quoted and used
5) Brochure, TV/radio show on a particular issue	Awareness raising, emerging issues	Able to catch attention – be surprising or of personal relevance	Official mandate, political /special interests	The issue is known, action is taken

In the first two cases, information feeds directly into existing management frameworks in a relatively straightforward way. In the next three cases information is 'softer' and more 'strategy-oriented'. In the longer run, however, it may lead to new management frameworks and changing patterns of behaviour through raising overall awareness. Hence cases 3 and 4 contribute background information on which decisions and actions may eventually be taken. The fifth case focuses on a particular issue, it provides information on a specific set of problems in the hope that decision makers will notice and act.

1) Pollution permit

Such situations account for considerable requests for environmental information. Routines and procedures are well established and often highly formalised. Information re-

quirements are usually well specified. The impact of information comes from a procedure carried out and completed as required within the current management framework.

There can also be situations where one can actually choose the level of investment by gathering information of varying precision, completeness or sophistication. If environmental effects of different investment options can be associated with statistical probabilities, then the value, or impact, of information is determined by its ability to reduce uncertainty, and thus lower the probability of taking a wrong decision (box 2.1). (Such analyses however, are only possible where a situation and a decision-making process can be simplified to a set of 'engineering-style' relationships. In complex real life situations, this may not be the case.)

Box 2.1 Decision-theory approach to value of information

Suppose that a decision-maker needs to choose one of the two available alternatives, A and B, each of them with certain environmental effects (the alternatives can be different locations of a factory, different technological solutions etc.). Some external factors will also influence the environmental effect, and we only know that these factors will develop following one of the three scenarios. The resulting environmental effects are measured on a scale from 1 (bad) to 3 (good):

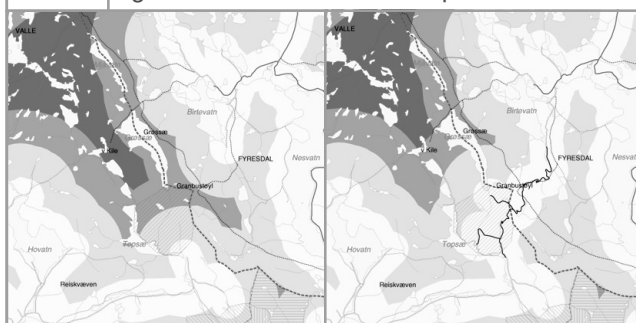
	Alternative A	Alternative B
Scenario 1	1	3
Scenario 2	1	3
Scenario 3	3	2

If we believe that all three scenarios are likely probable (e.g. we have no information about which scenario is more likely) then B is the obvious choice. If we receive information that Scenario 3 will happen, then A is the best choice. If this is true, then the value of this new knowledge derives from improved environmental effect (from 2 to 3) of the final decision. If this effect can also be measured in monetary terms, it represents the monetary value of the particular environment information.

2) Evidence in court

This kind of information is often defined fairly well too. Generally, its properties and sources need to comply with specific legal or procedural requirements. Yet this is a competitive procedure with outcomes depending on both the contents of the evidence and the results of its interpretation. Commercial firms and private lawyers offer high prices for solid environmental information that may be used for specific analysis that often entail quite short deadlines, say by highly specialised expertise for soil and water testing. Willingness to pay for environmental information has been increasing in recent years, as seen, for example, in cases of industrial mergers and acquisitions where environmentally related financial risks and potential legal liabilities are determined. From each party's point of view the impact of information here can be straightforwardly

Box 2.2 Wilderness maps – an argument against unsustainable development



In 1994 GRID-Arendal in co-operation with the Norwegian Mapping Authority prepared a wilderness map showing the impact of the construction of a road planned to connect two communities in southern Norway. The construction of the road would dramatically reduce the area of qualified wilderness (areas more than 5 km from any manmade infrastructure). The map was produced at a time when the final decision was on the table of the Minister of Environment. Under the Norwegian law, the Ministry of Environment could re-consider the decision made by the local authorities. The case was also sent out for hearing to the Directorate for Nature Management and Norwegian NGOs. The NGO 'Nature and Youth' that participated in the production of the map helped also with its distribution and was one of the main factors leading to its broad use. The map had a significant impact on the hearing process. It was used by both the NGOs and the Directorate for Nature Management in presentations given in meetings with the Minister of Environment. The map was also distributed to parliamentarians from that part of the country. Several newspapers printed the map and the national TV made an animation showing the wilderness disappearing as the road was being built. The Minister of Environment, who was under severe pressures from local groups from his own party in the region who promoted the construction of the road, NGOs, and the Directorate for Nature Management, decided to stop the construction of the road. The wilderness area is still untouched.

Due to arguments based on similar maps, large development projects were later also stopped in Svalbard and in Iceland.

Source: Tveitdal 2000, Kullerud 2000

measured by its contribution to winning the case. In addition, many developed and developing countries have passed national legislation making Environmental Impact Assessments (EIAs) mandatory for many kinds of investment projects - in both the public and the private sectors. Such assessments draw from multiple sources of environmental information – from the public domain as well as from commercial sources, and may involve different stakeholders in the process (box 2.2).

3) Public information in a library or on a web site

People approach such sources because they either need answers to specific questions (in this case the context of use may be close to those of cases 1 and 2), or are interested in a certain subject area in general and hope to find additional information, inspiration, or 'food for thought' ■. The latter situation is closer to cases 4 and 5. In both situations, the impact will be related to whether an answer was actually found.

'... people seek and use information for many more reasons than improving their policies and decisions. We seek information for excitement and pleasure and the satisfaction of our curiosity. We use information to coordinate and justify our behaviours, to gain status and power, and to adapt to changes in our circumstances. We produce and consume information to maintain friendships, to resolve conflicts, to teach, and to learn' (Thorngate 1995).

'What managers need is something which makes them think hard about the forces driving the economy; which focuses on turning points rather than on the precise expected level of GDP in the year ahead. The value of forecasts lies in making you think about risks and opportunities, not in providing a single number to build into sales and cost projections. On this basis, the ideas surrounding a forecast are more valuable than the numbers themselves. The most important thing you can say about a forecast, therefore, is not how close it is to the consensus, but how interesting it is' (Financial Times 1997).

'Conceptual use [of research knowledge] is likely to be more prevalent than instrumental use. It may also be more significant. Instrumental use is often restricted to relatively low-level decisions, where the stakes are small and users' interest relatively unaffected. Conceptual use, which does not involve immediate and direct application of conclusions to decisions, can gradually bring about major shifts in awareness and reorientation of basic perspectives' (Weiss 1981 in Scott 2000).

4) The state-of-the-environment reports

The purpose of such reports is to provide people (the public, politicians, administrators, etc.) with a general picture of the situation and to help users establish strategic priorities. It is not expected to **feed**, but to help **create** management frameworks, in particular to present highlights that can precipitate strategic discussions. A desired impact is achieved if the report becomes well known and is used as a credible reference in a relevant debate.

5) A brochure or a TV/radio show

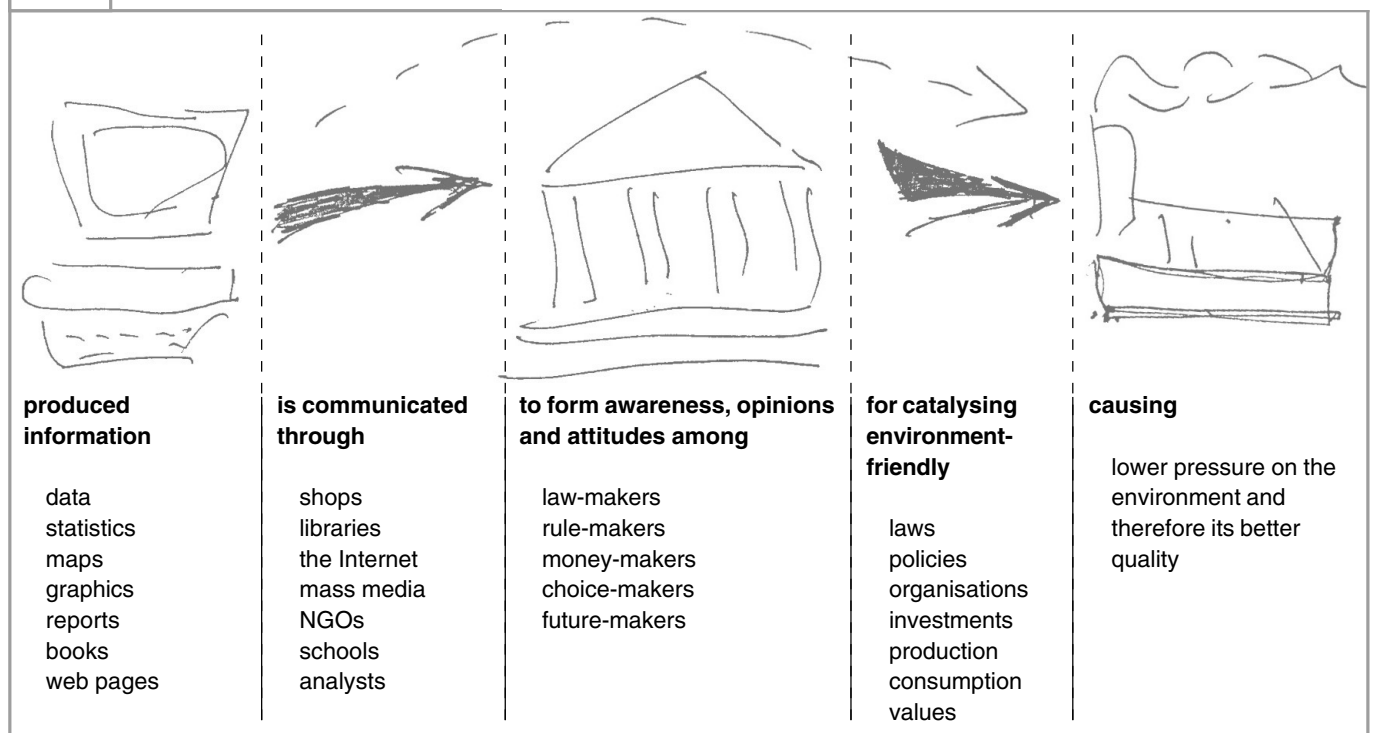
Often dedicated to a particular issue, this seeks to draw public attention to that issue and to build public interest for it. When reaching its audience, it may activate people in a desired direction. In time, this may lead to changes that are supportive of the desired impact (see also box 2.2).

Cases 3, 4, and 5 relate mostly to environmental information in the public domain. Its impact is less direct and more difficult to detect. This kind of impact of environmental information is the subject of the rest of the paper.

2.2 Information for awareness and strategic thinking

The impact of information that contributes to environmental decision-making and environment-friendly actions in a less explicit way often cannot be quantified, or even easily observed. Moreover, its value is not in delivering precise facts and analysis, but rather in provoking thought and generating discussions, or even simply educating while ■ entertaining (see footnote ■).

Fig. 2.1 The impact-of-information chain



Consider a simplified model of an ‘impact chain’ (fig. 2.1) that shows how information of this kind propagates through different stages of interaction between:

- the producers of information,
- the audience of its users, and
- the environment.

The left part of the chain represents the supply of information, while the right part represents the demand for information determined by its users and the context of use ■. (The ‘impact chain’ represents only a linear part of the process. Feedback loops are discussed further in the context of participatory approaches and measuring the impact of information. Also results of decisions and actions can have an influence on actors’ attitudes ■.) The different stages of the ‘impact chain’ are described below.

Production

This includes everything from data collection to interpretation to the publication of an ‘information product’ in the form of a report, a book, a graphic, a map, etc. At this stage, the producer of information can choose the content and the format of the product to be released.

Exposure

At this stage, information leaves its place of origin and is communicated to the outside world. Information may reach its target audience directly: people buy a report in a bookstore, borrow a book at a library, receive a briefing note in mail, or download a map from the Internet. The same information can also reach its audience through such intermediaries or ‘brokers’ as:

- the media,
- special interest groups (NGOs, clubs, parties),
- analysts,
- schools.

Such channels of communication are able to ‘filter’ and refocus information according to the specific needs and interests of their own target audiences. Different ‘filters’ reach different target groups ■ often with user-specific information products (different people read different news-

Related models are also discussed in (Centre d’Estudis... 1998, Huberman 1994, Scott 2000).

‘There is no simple, one-way relationship between awareness, information and action – each can influence the others in complex and subtle ways’ (EEA 1999).

‘Those who go to the movies three times a week are not the same people who read the newspapers with care’ (Ellul 1973).

Box 2.3 TV curbs teenage smoking

‘Crispin Porter & Bogusky, a small Florida-based social marketing agency... had great success in reducing youth smoking since 1997 by creating an anti-smoking brand called truth. The campaign seeks to demonise the sleazy practices of the giant multinational tobacco companies, largely by means of black humour. One television advertisement is based on a spoof award ceremony in which Mr Tobacco wins the “mass-killer” prize over Mr Suicide, Mr Murder and Mr Illicit Drugs. Jeff Hicks, a partner in Crispin Porter & Bogusky, says the whole thrust of its campaign has been to empower the young to make their own decisions rather than to lecture them about the dangers of smoking... “The reason kids use tobacco is not rational. It is emotional. They all know that it will kill you... But youths use tobacco for the same reason they dye their hair or pierce their ears. They do it for reasons of style and self-expression... We realised that we could not take away this tool of rebellion from them without giving them back something else. So we focused on creating a rebellion against the tobacco industry”

The campaign has helped reduce smoking prevalence among Florida schoolchildren aged 12 to 14 by 40 percent – although the success rate was less than half for that among the 15-17 age group...

From the global perspective, however, the challenge will be to try to spread many of these ideas to the developing world. For example, a survey in China in 1996 found that 61 percent of smokers still thought that tobacco did them “little or no harm”.

Source: Thornhill 2000

papers). The communication stage is critical for information to have any impact. Information produced but not disseminated will remain unknown and lose its significance (see section 2.3).

Awareness, opinions, attitudes

Groups such as the media or NGOs are sometimes perceived as end users of environmental information. Instead, they should be considered effective intermediaries of environmental knowledge to those in a position to make decisions, such as:

- law-makers (politicians),
- rule-makers (bureaucrats),
- money-makers (businessmen),
- choice-makers (consumers, voters),
- future-makers (children, students).

The purpose of a provider of ‘strategic’ environmental information is to build environmental awareness among these users, so that they would gain important environmental knowledge of key issues, understand the trade-offs

of various solutions, and make educated decisions based on their best judgement.

What actually happens when people become aware of an issue is difficult to understand. Sociological and psychological studies suggest that relations are not at all simple (Ellul 1973) between private opinions of individuals, public opinion that often relates to that of private individuals only indirectly, and the build-up of an attitude, ‘a form of unconscious habit that expresses profound tendencies in a drive towards action’ (one of existing definitions, Young 1947 in Ellul 1973). Certainly, awareness alone does not always lead to action, just as the lack of awareness does not always mean that no action will be taken ■. In real life it may very well happen that information is also used to justify decisions after, rather than before, they are taken ■.

In certain situations, the process of forming a needed attitude may be equally effective if the audience is approached directly at the subconscious level, bypassing thorough awareness building. If the purpose is to make concrete things happen, then working on the emotional ground may gain results; it is sometimes not the lack of knowledge that prevents people from making or changing their minds (see box 2.3 and discussion in section 2.3). This was known for a long time and has been exploited by the media, advertisers, and masters of political propaganda ■ (Ellul 1973, Rushkoff 1999).

Finally, environmental knowledge is rarely the sole motivation for people to take environment-related decisions. Other factors such as economic considerations, traditions, culture, and social issues can interact with knowledge in a complex way and either strengthen or weaken the effect of environmental information. ‘...Increases in the reliability and certainty of climate science... may **not** necessarily lead to more effective decision-making at all... Why? Because there are non-scientific human-dimension uncertainties that may matter just as much or even more in determining

An interesting illustration in this respect is a recent study in Norway showing that the relation between environmental awareness and environment-friendly behaviour is hard if not impossible to observe by empirical evidence (Hellevik and Høie 1999). A study in the UK has also shown the relation between the level of education and the level of appreciation of global (but not local) environmental issues (Haklay 2000).

‘Most good policymakers know it: “Get me some data that justify my decision!”. Why not? Psychologists who have studied the weaknesses of human decision-making have also developed great respect for its strengths’ (Thorngate 1995).

‘In *Mein Kampf* Adolf Hitler wrote that a leader could not gain followers by mere explanation or instruction; these have never moved the masses... “it is always a devotion which has inspired them...”’ (Clark 1997).

Box 2.4 Maps stop urban merger

‘In her study, “Reinventing Cities for People and the Planet”, [Worldwatch author] Molly O’Meara shows that changes in six areas — water, waste, food, energy, transportation, and land use — are needed to make cities and the vast areas they affect better for both people and the planet...

The misdirection of money is not the only obstacle in the way of building better cities. “The people and businesses committed to current wasteful patterns of development constitute a potent political constituency,” says O’Meara. “With better information, citizens can form a counterweight to powerful interest groups.”...

New information technologies ...hold promise for political change. Geographic information systems can be used to create maps that highlight urban problems. In Maryland, a recent study used such a system to produce a video that showed Baltimore and Washington merging into one massive agglomeration. Maryland’s governor credited the video with helping him win legislative approval for his anti-sprawl initiatives...’

Source: Environmental News Network 1999

whether scientific information is actually used in decision-making... People differ in how they expect the world to work, how they value scientific knowledge, in their attitudes towards uncertainty and ignorance... In addition, there are uncertainties in how... signals are perceived, how people define the problem, who the involved actors are, what policy-making and management institutions are involved, which policy choices and strategies are available, feasible, chosen and implemented...’ (Moser 1999).

The way new information relates to previous knowledge and attitudes of people and organisations will also determine the impact of that information ■.

Decisions

‘Strategic’ environmental information can act in two ways. Sometimes it can directly encourage immediate actions if a solution is already within the practical reach of the

‘The receiver’s state of mind and general situation is critical to the successful communication of information that intends to change behaviour’ (EEA 1999).

‘Refrigerator and freezer energy... label had little effect on purchasing patterns in the southern countries, even though the benefits of cold appliances would be greatest where the summer is hot. In northern countries, where there is a longer history of concern about energy use, the label has had a much greater influence... The energy label can thus be considered to be successful where there is already a concern about energy use; it does not, by itself, appear to generate this concern’ (Winward et al. 1998 in EEA 1999).

audience (to buy or not to buy; to vote or not to vote; to drive or not to drive).

But decisions are not only made on considerations of individuals and institutions, they are strongly influenced by visible and hidden systems of interests. Understanding these systems is the key to understanding the impact (or the lack of impact) of environmental information. If delivered in the right context, information can help promote, develop and establish more formal management frameworks supposed to modify the behaviour of people or organisations in the desired direction, such as laws or economic mechanisms. Then information plays a role both before a framework is introduced - to raise awareness about its importance - boxes 2.4, 2.7 and 4.4, and when it is being implemented - to maintain awareness about the importance of the issue, to explain new mechanisms, opportunities it offers, and practicalities of implementation (REC and UNEP 2000).

It is interesting to note here that messages focussing only on the magnitude of an environmental problem (e.g. the state of the environment), or only on possibilities available for environmental action (e.g. new technologies), are likely to be less effective than messages that present both a problem and a solution side-by-side in an interconnected way (see chapter 4).

Impact

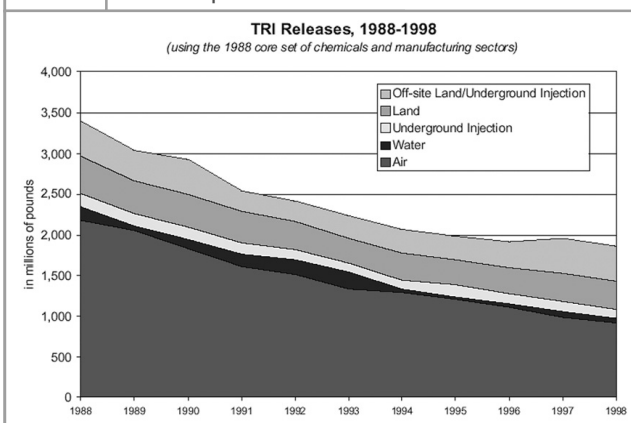
The final stage in the chain is where we might be lucky enough to observe a positive change in the environment. Boxes 2.2, 2.3 and 2.5, and to some extent boxes 2.4, 2.7, and 2.8 illustrate cases where such a change has been quite

‘While information plays a prime role, it is not sufficient *per se* to advance towards sustainability. Sustainability and environmental information can become a powerful source of change only when it can be broadly incorporated into the social contexts and policy processes and, in this way, influence substantial decisions on the use of natural resources and the quality of the environment’ (Centre d’Estudis... 1998).

‘When a politician is to make an environment-related decision, environmental considerations may be on the last place. The first question may be, what other consequences this decision will have for a constituency in question, and not last for the decision-maker personally’ (Dan Claasen, pers. comm.).

‘When Norwegian air quality limits were to be set, the environmental authorities could choose from several alternatives. By choosing the strongest target, one could attain a large environmental gain, and both the public and private sector would save money. A far less radical alternative (but actually imposing higher costs on the society) was chosen. This decision must be seen in relation to the weakness of the Ministry of Environment within the Government at that time. The strict alternative would have resulted in changed transport policies not wanted by the Ministry of Transport’ (Morten Wasstøl, pers. comm.).

Box 2.5 Toxic Release Inventory: effect of public access



‘When Congress included the section of EPCRA that establishes the TRI, the full impact of this far-reaching decision was not clearly foreseen. The concept was that the public should know – indeed has the Right-to-Know – about the releases of toxic chemicals in their communities. This simple, but logical, conclusion has resulted in one of the most successful and innovative environmental programs in the United States. In the eleven years of TRI data, from 1988 – 1998, the releases of toxic chemicals have decreased by 45,3% ...

There are many reasons for the success of the TRI. Perhaps the most compelling reason is its simplicity. There are no requirements other than the collection and dissemination of information about how facilities release or manage their chemicals in waste. Communities and public groups around the country have found innumerable opportunities for improving environmental protection by using TRI data. Among the most significant successes is the increasing interaction between industry and the public... Regional and local environmental organisations have created mapping tools that show the location of TRI facilities, as well as other sites of environmental concern in the area... National environmental organisations have created user-friendly websites that allow the public to search for TRI data across the country. Anecdotal evidence of public interest is that one of these websites received over 6 million hits in its first six months of operation.’

Source: Morant and Harman 2000

clear and where information has played a decisive role. Difficulties in systematically collecting such evidence are discussed further in chapter 3.

2.3 Information versus communication

As noted in the discussion of the ‘exposure’ stage of the ‘impact chain’, even high quality information that is not communicated has little or no possibility to reach decision-

Box 2.3 is actually a health care case, but shows many close parallels between solving health and environmental problems.

makers. It thus remains in ivory towers of laboratories and think tanks and results in no impact. While the quality of the contents is essential, active communication is another vital ingredient that needs to be added ■.

Boxes 2.2 through 2.5 all clearly illustrate this. A video had to be produced to communicate GIS-based analysis to the legislature in Maryland. Teenagers in Florida perfectly know that smoking is dangerous, but it took a sophisticated TV campaign to make 40 % quit. Toxic Release Inventory records and wilderness maps were in the first place mobilised by public groups that broadcast the data and solicited a broad support.

Figure 2.2 explores an apparent relation between information, communication and the resulting impact. So far, this link is not fully substantiated by systematic evidence but has emerged in a number of cases. (The challenge of measuring the impact of information in quantitative terms is discussed in chapter 3.)

The assumptions are:

- Improving only the quality of information provides limited opportunities for achieving effect, which can however be further enhanced by a more active communication strategy;
- Too intense communication of information, without simultaneously improving its quality, may have a detrimental effect when the public gets tired of the same invocations and demands fresh news and more precision.

If these assumptions are true, then the optimum strategy over time may be (as in the dotted line in fig. 2.2) a relatively active publicity in the beginning, a fast consecutive improvement of the information base afterwards, and then a balanced growth in both directions until the limit of the possible impact is reached. (The notion of a limit has to do with the fact that awareness of the issues and even readiness-to-act is always weighed against other factors that influence the actual decision-making, see section 2.2).

Figure 2.3 explores the differences in the expected impact that various information and communication strategies cause over time.

‘There is currently no direct translation between the S[ea] L[evel] R[ise] impact analysis and the daily reality of the policy and decision-makers. Global SLR scenarios, cumulative data on wetland losses, national declines in GNP... serve at best as supplementary arguments in legislative findings, or to justify more research or to request additional programme funds. They do **not** affect daily decision-making.’ (Moser 1999). In the case of the sea level rise however certain impact may have been achieved recently due to increased publicity: small island states are now well aware of the problem and influence negotiations on greenhouse gas emissions (Svein Tveitdal, pers. comm.).

Fig. 2.2 Impact as a function of the quality of information and the type of communication

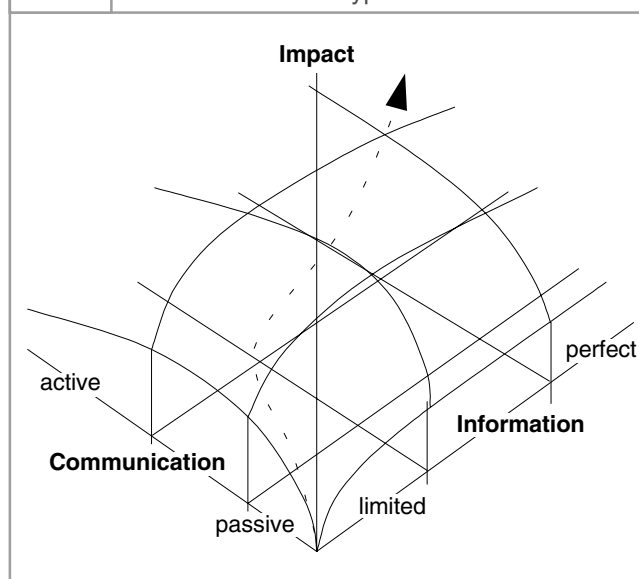
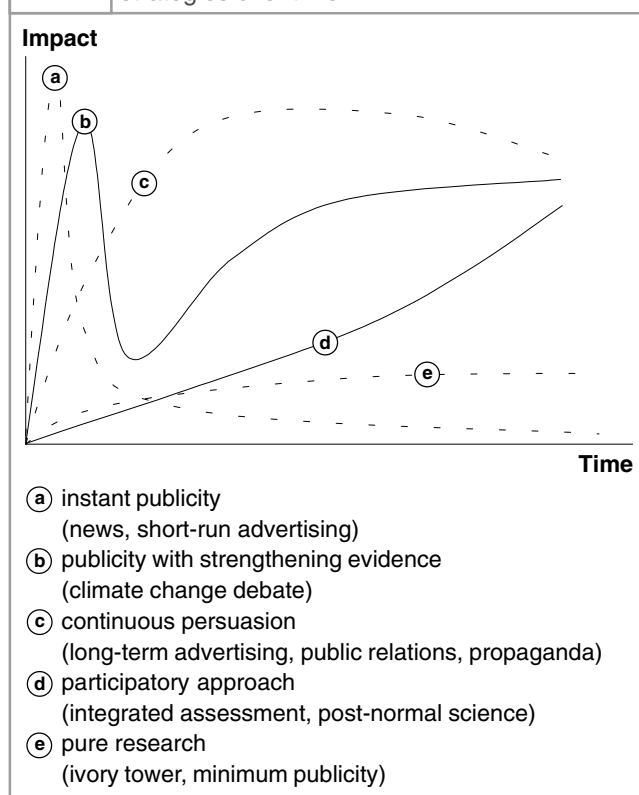


Fig. 2.3 Impact of various communication strategies over time



Research without communication (e) beyond the ivory tower of the professional community builds very limited impact over time ■. (Of course, somebody other than re-

‘Scientific publications are what we have always done; they are an easy answer; and they are for us what establishes credibility... But they are insufficient to reach the audience we ultimately want to inform...’ (Moser 1999).

‘We have known since the 1920s (Lotka) and later (de Solla Price) that a tiny fraction of research published in peer-reviewed (but also trade) journals reaches other academics. The proportion of research that reaches practitioners and policymakers is even smaller’ (Dunn 1992 in Scott 2000).

searchers may occasionally communicate the findings, but this is a rather defensive communication strategy.)

A short intense publicity campaign (a), for example, in the mass media is able to attract attention and even cause action (people may actually start buying what is advertised). But unless the campaign lasts its effect will soon fade as attention of the audience will turn to another subject.

However, if a campaign is sustained (c), it may capture attention and influence people's attitudes and action over long periods. The results can be miraculous, hence the widespread success and practice of political and commercial propaganda including advertising and public relations (Ellul 1973, Rushkoff 1999, Clark 1997, Chomsky 1997).

Not surprisingly, while effective, this approach has several considerable drawbacks:

- It requires constant injection of resources and a consistent use of various media of communication ■;
- When it comes to a stop, the results will largely fade out if no credible evidence is available in the long-run to support the claims made by propaganda;
- Based on psychological manipulation, such strategy is simply dangerous to the society, whether it is used to advocate a good or a bad cause (box 2.6 and annex 4) ■.

A communication strategy that may in the short-run be less efficient but prove long-term sustainable (b) is discussed above: a combination of one or several instantaneous

'Propaganda must be total. The propagandist must utilise all of the technical means at his disposal – the press, radio, TV, movies, posters, meetings, door-to-door canvassing... There is no propaganda as long as one makes use, in sporadic fashion and at random, of a newspaper article here, a poster or radio program there, organises a few meetings and lectures, writes a few slogans on walls.... Each particular medium has its own particular way of penetration – specific, but at the same time localised and limited; by itself it cannot attack the individual, break down his resistance, make his decisions for him. A movie does not play on the same motives, does not produce the same feelings, does not provoke the same reactions as a newspaper... A word spoken on the radio is not the same,... does not have the same impact as the identical word spoken in private conversation or in public speech before a large crowd. To draw an individual into the net of propaganda, each technique must be utilised in its own specific way, directed towards producing the effect it can best produce, and fused with all the other media, each of them reaching the individual in a specific fashion and making him react anew to the same theme – in the same direction, but *differently*' (Ellul 1973).

Other researchers of coercive techniques believe however that 'using what influence we have is not in itself a destructive thing. The problem arises when the style and force of a person's or institution's influence outweighs the merits of whatever it is they're trying to get us to do' (Rushkoff 1999). But who can judge at what stage the merits are outweighed?

Box 2.6 Propaganda: a threat to democracy

'What gives propaganda its destructive character is not the singleness of some propagated doctrine; it is the instrument of propaganda itself. Although it acts differently, according to whether it promulgates a closed system or a diversity of opinions, it had profound and destructive effects.

...if democracy is a way of life, composed of tolerance, respect, degree, choice, diversity, and so on, all propaganda that acts on behavior and feeling and transforms them in depth turns man into someone who can no longer support democracy because he no longer follows democratic behavior... The question is not to reject propaganda in the name of freedom of public opinion – which, as we well know, is never virginal – or in the name of freedom of individual opinion, which is formed of everything and nothing – but to reject it in the name of a very profound reality: the *possibility* of choice and differentiation, which is the fundamental characteristic of the individual in the democratic society.'

Source: Ellul 1973 (see also annex 4)

campaigns to ignite public and political attention coupled with a steady build-up of the true knowledge of the issue ■.

In the first stage, a campaign based on a still limited knowledge can catalyse a dialogue and initiate a further collection and more thorough analysis of information. This leads to improved knowledge that may be the basis for increased and more effective publicity. In the end, even without more publicity, the impact is likely to sustain because it is based on objective information that can stand the test of time. The history of international debates on desertification (box 2.7), climate change, and acidification in Europe are examples of such an approach.

An alternative, or rather complimentary, promising strategy (d) is the broad involvement of decision-makers and other stakeholders in the very process of information development that turns into a continuous interaction among various and often different information sources and viewpoints. The process itself serves as a communication tool, the impact steadily builds as produced information reaches all process participants including most relevant decision-makers, and then a wider audience beyond the 'inner circle'. The results are well institutionalised and are likely to sustain, and the established social dialogue may even be capable of changing social values, more than what would be possible with one-way broadcasting. A discussion of these and other benefits of a participatory approach to developing and communicating environmental information continues in the following section.

'...where there is an authoritative report by a scientific body... and there is extensive coverage by the mass media, and different choices are readily available, without much financial cost, then behaviour can change dramatically' (EEA 1999).

2.4 Participation more important than winning

As discussed, information is clearly capable of generating discussions as well as other processes whose value for decision-making may in the end be greater than that of the original 'catalysing' information. Notably three effects are of particular interest:

1. strengthened capacities of process participants to generate and handle environmental information;
2. improved quality and acceptance of generated information due to multi-lateral inputs and controls; and,
3. better awareness of the findings among process stakeholders as well as a wider audience due to a direct involvement of the former in the process and their inherent interest in broadcasting the results to the latter.

Strengthened capacities

The process of collecting, processing, and producing information strengthens networks of organisations and people. Such networks can form a solid basis for a continuous, sustainable production of information in the future. Well recognised examples are institutional networking impacts of introducing and institutionalising geographic information systems (Simonett 1993), and of state-of-the-environment reporting (PLANISTAT Europe 2000, Simonett et al. 1998); see also a discussion in annex 2).

Box 2.7 Credible information for combating desertification

When prolonged drought periods in the Sahel captured international attention in the mid-1980s, gloom and doom predictions prevailed, pointing out that the deserts were expanding rapidly to cause irreversible arable land losses. Credible, science-based information was not immediately available to counteract this international fervour, which resulted in popular and political demands for extra funding, special desertification programs, and for a desertification convention. Part of the problem was that the time series used for basic reference was too short (10-15 years) and that it ignored the considerable resilience in biomass activities. More reliable data were subsequently published on long-term trends – painting a different picture of large oscillations around an apparent even trend line over the last 90-100 years. An international scientific conference in 1990 concluded that "available data sets do not confirm the hypothesis of a secular trend toward desert-like conditions." (SAREC, Ørenas conference, December 1990). Studies by Dregne and Tucker, UNEP (1988) and by Ulf Hellden, Lund University (1991) substantiated this conclusion. Today the International Convention on Combating Desertification focuses main emphasis on man-made land degradation, rather than the earlier feared expansion of the deserts. The issues related to man-made land degradation rely on sounder empirical technical data and on more credible scientific knowledge.

Source: Hellden 1991

Improved quality and acceptance

A participatory process automatically exposes information to a thorough quality control already at the production stage. The broader the 'inner' circle is the more chances that major flaws are discovered. Naturally, this may bring out a variety of perspectives through substantive inputs from the participants, which enriches both the process and the information product. In some countries today, the traditional producers of environmental information such as ministries of the environment also want to involve different sector ministries and other users of information. (In the production of SoE-Norway, for instance, the Ministry of Environment brings in many sector ministries as well as local governments.) The involvement of future

Box 2.8 Negotiating critical loads data: a post-normal approach to normal challenges

In 1979 the Convention on Long-Range Transboundary Air Pollution (LTRAP) was approved. It was signed by 34 parties and ratified in 1983. The 1985 Helsinki Protocol establishing the reduction of sulphur emissions of at least 30% of their 1980 levels was signed by 20 parties. Among the countries that did not sign the protocol were two of Europe's larger emitters, Poland and the UK. Objections were directed at the arbitrary nature of some parameters including the lack of consideration of the specific characteristics of each territory. The 1994 Oslo Protocol aimed to address these issues by inter alia adopting critical loads, thresholds to acidic depositions below which it is assumed no deleterious effects occur.

The work on the effects of acidification was perhaps the most established at that time with an extensive community of ecologists working on aquatic and terrestrial effects. Critical loads were derived through annual workshops where national representatives met to present methods and results for preparing a European critical loads map from national data. However, in the time leading up to the agreement, several changes were made to the data in response to national request. 'Madrid modifications' for certain grid squares, mostly in Scandinavia, were requested because critical loads previously calculated seemed unrealistically low. Another amendment was made to make the data fit into the framework of the discussion. Since the protocol was aimed at reducing sulphur emissions only, acidity critical loads data were split into a nitrogen and sulphur component, for which the chairman of the Working Group on Effects describes as 'difficult to justify scientifically'.

Thus, after a wealth of scientific work, ecosystem data were reduced to critical depositions maps, further modified after international discussions and ultimately reduced to a single value for each grid square. Critical loads are a good simple way of communicating different relative sensitivities of ecosystems. They allowed national governments in preparing consistent data so that the protocol was eventually signed by 24 countries. However, by that stage critical loads were essentially political rather than scientific numbers.

Source: Gough et al. 1998

users can ensure that information does in fact properly fit into a real-life management context and thus can readily be put into practical use ■

As noted earlier, Environmental Impact Assessments (EIAs) have become legal requirements for investment projects in many countries. While widely accepted and generally endorsed, EIAs are often criticised for providing environmental information too late in the decision-making process, and for providing an excessive amount of environmental information (overwhelming and stalling decision-makers). A significant improvement in this regard would be the application of a more broad-based Sectoral Environmental Impact Assessment that would bring out at a very early stage the environmental issues facing the different planned investment components of a sectoral investment program, e.g. options for national road construction programs, energy plans, or other public works. Several countries have been exploring this approach in recent years, and interest for it seems to be growing. However, this mechanism has not yet been put into general use. When this happens, there will be interesting information-sharing possibilities and operational process linkages to the active participation by sector ministries in state-of-the-environment reporting.

'Analysts seem to agree that the line between science and policy is one that shifts over time, especially where issues are characterised by high levels of complexity and uncertainty, as with many environmental problems. This boundary is itself constructed around a 'fundamental tension of scientific assessment in the policy arena – maintaining scientific credibility (by not politicizing research) while assuring political saliency (by producing information that is relevant and useful to decision makers)' (Scott 2000).

'The transformation of consumption information into information for use, for decision-making, for knowledge creation... requires going beyond the one-linear relation between active processors of environmental information (mass media and institutional sources of information) and passive receivers, to achieve a multilateral and interactive dialogue between them. The resulting communication process is characterised by its complexity, its ambiguity, and by a less-schematic scenario, where interactivity is the power' (Centre d'Estudis... 1998).

'Citizens will also need to have adequate *indicators* to learn about social and environmental change. However, and most important, there is also the need for participation of citizens in the selection and definition of the most appropriate indicators... Indicators proposed by experts might say little to the public and not integrate their views or possibilities for action. People, by participating more actively in the shaping of sustainability indicators might also be more actively engaged in trying to direct them towards democratically selected goals, which are closer to sustainable paths... By making the public active in the process of production of the content and the format of indicators, information could be converted into real communication, made practical knowledge, and be more easily linked to decision and action. Hence participatory sustainability and environmental information should begin first by opening debates about what the problems that mostly affect local populations are, defined in their own terms' (Centre d'Estudis... 1998).

The environmental field today faces not just uncertainties but also decision stakes that are very high, whereas values of different stakeholders are normally in conflict, and yet decisions have to be made. The notion behind the so-called 'post-normal' (as compared with 'classical') conditions of practicing applied science (Ravetz 1996, Gough et al. 1998, Funtowicz et al. 1999) is that information supporting environmental decisions can no longer rely only on traditional scientific quality and credibility checks. It needs to incorporate and reflect values of various key stakeholders, both producers and users of information ■

This is one idea behind integrated assessments. 'The contribution of all the stakeholders in the case of Post-Normal Science is not merely a matter of broader democratic participation. For these new problems are in many ways different from those of research science, professional practice, or industrial development. Each has its own means for quality assurance of the products of the work, by their peer reviews, professional associations or the market. For these new problems, quality depends upon an open dialogue of all those affected. This we call an 'extended peer community', consisting not only of persons with some form or other of institutional accreditation, but rather of all those with a desire to participate in a resolution of the issue... For the formation of environmental policy under conditions of complexity, it is hard to imagine any viable alternative to extended peer communities... None can claim that the restoration of quality through extended peer communities will occur easily... but in the process of extension of peer communities through the approach of Post-Normal Science, we can see a way forward, for science as much as for the complex problems of the environment.' (Funtowicz et al. 1999; see box 2.8) ■

There is also a socio-political perspective. The possibility to make inputs into a process that affects major rights, including environmental rights, is certainly a necessary attribute of a democratic society. Among organisations involved in developing the Århus Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters, there is a common distinction between 'life' and 'dead' information. The latter is what is published and is thus not anymore subject for

'In contrast to the objective 'truth' often expected from knowledge providers, a 'shared truth' [is] a negotiated knowledge usable for policy decisions' (Scott 2000).

As said, this concept within integrated assessment stems from research in the theory of 'post-normal science', primarily in 1990s. A European Forum of Integrated Environmental Assessment aims to promote the implementation of its principles into practice. So far most documented results have been in the area of air pollution (see box 2.8) and climate change. A conference on integrated assessment for eutrophication control was held in Paris in 2000 (details: www.efiea.org).

modification; the former is information that is still under public discussion and thus can be modified in the course of a social dialogue.

Communication through the stakeholders

The knowledge, information and motivation that result from a two-way discussion certainly make a bigger impact on the participants of such a dialogue than if they were subject to one-way broadcasting. A process that incorporates major decision-makers, for whom the information was produced, is more likely to influence desired decisions and positive environmental changes. Furthermore, the active participants of the process become themselves the communicators of information. Such a mechanism may be equally productive in reaching also other parts of the society as the dissemination of this information through traditional channels.

Measuring the impact

3.1 The challenge

Although some good cases with convincing impact of information have been presented, their overall systematic documentation can be difficult to achieve for several reasons (see also box 3.1):

1. Information itself is a relatively weak instrument of environmental management compared to more efficient tools for changing human behaviour, such as laws, taxes, or voluntary agreements. Information makes its strongest impact when it catalyses, supports and relies upon such more powerful mechanisms. But then, if such impact is well manifested and can be measured, it is seldom easy to distinguish the 'pure' or 'net' contribution of information from the combined total effect of all methods of influence used.

It may also be difficult to separate the effect of a specific information product from previous or other knowledge that may have contributed to the same action.

2. Both short-term and long-term effects exist and need to be considered (fig. 2.3). Pronounced short-term effects are fairly easy to observe. In areas like commercial advertising, political propaganda and public relations, there exists

Some other environment-related cases not included here as boxes are assembled in (Christoffersen et al. 2000b).

Difficulties of documenting the impact of official environmental information are also discussed in (PLANISTAT Euro 2000).

'...information is necessary but not sufficient for development, its effects are usually indirect and delayed, and it is never useful on its own... To assess the relative value of information against its funding competitors is like assessing the relative value of food versus water...' (Thorngate 1995).

'There is little information available that could help determine the optimum investment in public information provision on pollution release and control. A review of economic analyses of information disclosure strategies for pollution control (Tietenberg 1997) concluded that, whilst there is evidence that information strategies can be effective in motivating environmental improvement, there is no evidence about the cost effectiveness of such strategies compared to other methods of pollution control' (EEA 1999).

plenty of anecdotal if not quantitative evidence of instant tangible success like rising sales, elections won, or public opinion turned in an opposite direction (Ellul 1973, Rushkoff 1999, Clark 1997, Chomsky 1997, Herman 1992 and literature cited therein). Similar records can be found for 'social advertising' (box 2.4). However, deeper prolonged effects, which are of equal if not of higher importance are far more difficult to assess, especially if no effect is being observed: indeed when can we finally say that there has been none (box 3.1)? In this respect box 2.5 is a remarkable example of impact that was noticeable immediately and had continued to be so during 10 years of observation.

The very same issues interfere when measuring effects of information on opinions and attitudes instead of actions and their consequences. Sociological and psychological observations and experiments may at best capture immediate and partial outcomes that may have little relevance to the total picture. Research using opinion polls and focus groups, for example, is best able to capture trends of immediate relevance. Furthermore, projections from private opinions to public opinion and further to attitudes will remain weak and uncertain for reasons discussed in the previous chapter.

'The impact of the media on society can be more noticeable in the discovery of unknown realities, preferences, and possible courses of action, than in influencing the final selection of specific options. The media can *induce social change* to the extent that they show to large sectors of population a novel set of possibilities for social action that could not be known otherwise. However, change can be brought about only when these new courses of social action are available in some way or another in the immediate context where individuals carry out their daily activities. The media do not provoke social change, but reveal to many people that certain social and personal options might be available. In so far as the boundaries of individual perceptions set the limits for social action, the discovery of new realities through the media might open the way for new actions' (Centre d'Estudis... 1998).

'As has already been noted, policy is no longer developed by a small group of 'policy-makers' but needs to be legitimised by a large group of institutions with widely different sets of interests. Research dissemination needs to hit this large group of interests if it is ultimately to be effective. The effects of broad dissemination are certainly more difficult to measure, but this does not mean that it is any less important an activity' (Scott 2000).

3. In general, even knowledge about tangible short-term effects still remains sporadic. Notions that advertising costs should be within 5 to 20 % of the sale price (Ellul 1973) or that an advertising campaign has on the average only a 15 % chance of being successful (Lloyd Masters Consulting 2000) are, for example, helpful rules of thumb. However, they are not comprehensive enough to allow systematic comparable assessments of the effectiveness or cost-efficiency of information in quantitative terms. That area still largely relies on ‘observation of general phenomena, by the best possible use of our general knowledge of man and his socio-political environment, by a mixture of judgement and approximation...’ (Ellul 1973) ■.

”Determining the effects of research among all of the other influences on the development of policy and practice in such a wide range of organisations and situations is ‘a nearly impossible task’ (Huberman 1994). Indeed, to follow the path of the influence of each email message, publication, personal contact and all the other myriad communications... is probably impossible under the laws of thermodynamics!” (Scott 2000).

‘...it is not impossible to attribute an *influence* of the retrieval of a document to a subsequent real-life event, but developing the method would require some original research. Put more positively, using a broader measure, it is possible to assess the contribution of retrieved information to user actions, over a number of actions. That is, we are not likely to be able to assess the contribution of a particular document to the winning of a case at law, but we can assess the contribution of the process of recovery of information to winning cases, over a number of cases’ (Meadow 1995).

Box 3.1 Some fundamental difficulties of measuring the effectiveness of propaganda

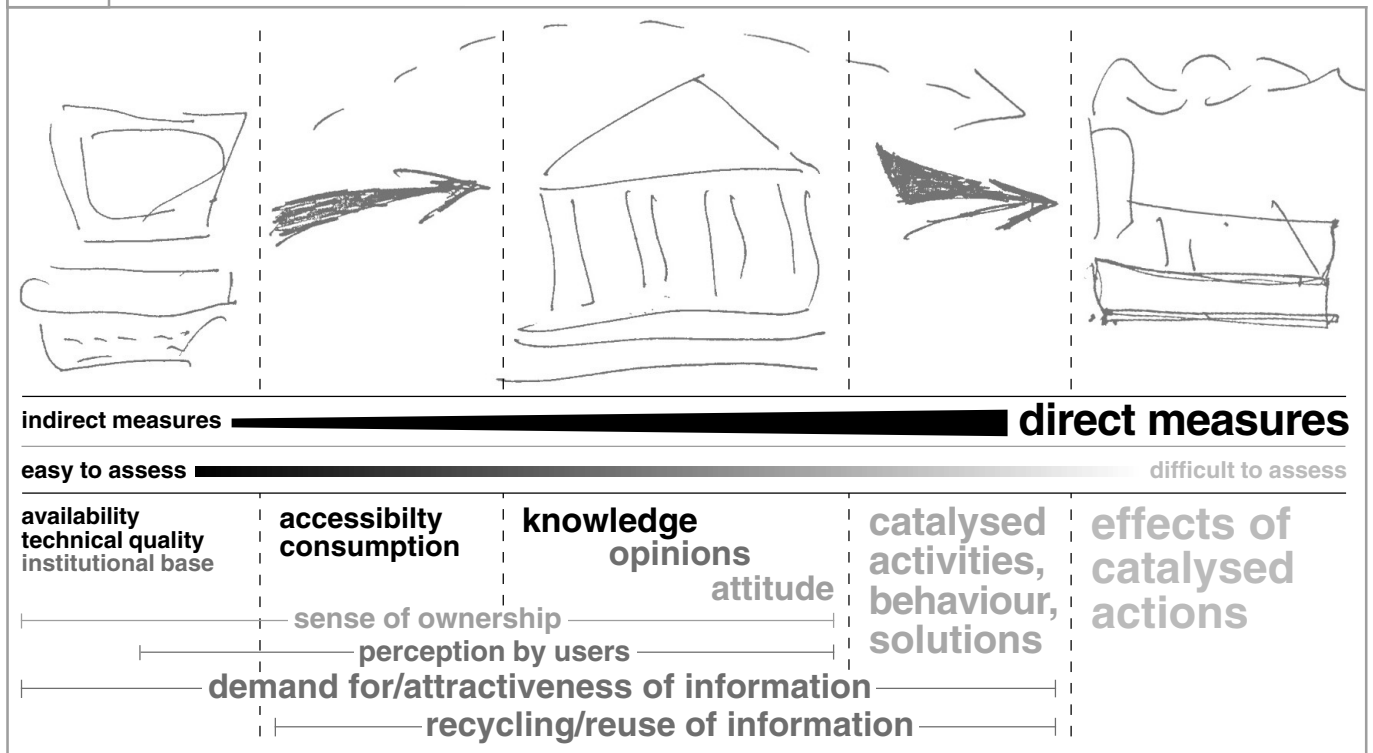
- Propaganda tends to affect people in-depth, and not just with respect to certain circumscribed actions. How then can we measure an entire situation, particularly if the effects are latent?
- There is a delay between the moment when the propagandist acts and the one when certain effects begin to show. At what stage can one say that propaganda has failed?
- Propaganda becomes increasingly expensive. therefore the question inevitably arises: do the results justify the costs? Are the returns worth the game? Do constantly rising costs produce increased results? What is the optimal level? We are far from being able to answer these questions.
- Effects must be gauged beforehand because propaganda must be directed and adjusted if maximum results are to be obtained. But we are barely able to see *past* effects. All the more serious, when we find on the basis of *past* effect that propaganda is *failing*, that means that it has *already failed*.

Source: Ellul 1973

3.2 Measures of impact

Approximate measures of the impact of information are though available and can be used. Figure 3.1 puts this discussion in the context of an ‘impact chain’. Measuring effects and qualities in the right-hand part of the impact chain is without doubt more relevant for assessing the impact of information, but for the reasons discussed this is

Fig. 3.1 Direct and indirect measures of the impact of information



Box 3.2 What are people searching for?

GRID-Arendal's home page includes a search tool that allows people to type in any word or phrase and search for it throughout the web site. This study examined the words that people typed in as search terms from June through October 2000. A wide variety of search words and phrases were found. Even after aggregating query phrases, no single query was responsible for more than 3.4% of the total queries. Queries ranged from the general ("environment") to the very specific ("which countries are responsible for Norway's acid rain problem"). Other queries were topical - in particular, searches for "russian nuclear submarine" and similar terms. Searches that occurred more than 1% of the time were 'France' (3.4 %, likely through publicity at *Le Monde diplomatique* and on French TV), 'acid rain' (2.7 %), 'nuclear...' (2.2 %), 'Aral Sea (1.8 %)', 'ozone' (1.3%), 'heavy metals' (1.1%). One might also expect climate change to rank highly, and it does (at 0.9% of requests). However since it is already represented by a link on the home page, it is not as frequently requested as a search.

Possibilities that suggest themselves from this analysis:

- There may be opportunities to better serve visitors interested in areas outside GRID-Arendal's geographic specialty by directing them to other sources of information.
- For highly topical issues GRID-Arendal may consider preparing small briefing packages on short notice in reaction to major world news stories.
- GRID-Arendal could consider developing new content, or linking to existing information, about issues such as acid rain, nuclear issues, ozone, and heavy metals.

Source: Brian Lucas (details in annex 3)

also more difficult. Instead one could make certain assumptions about the qualities of the information process in the left-hand part of the chain that are likely to ensure a desired impact even if we cannot observe it directly. By applying such indirect measures to a particular information process it is possible to find out if that is likely to result in a significant impact, as well as to identify possible bottlenecks for achieving it.

In general, it is natural to assume that an 'ideal' process should on the supply-of-information side

- produce good information
- that is effectively communicated
- to the right people.

On the demand-for-information side of the chain the users then would

- digest this information,
- make right decisions, and
- improve environmental situation.

Some of these qualities can be measured, although we still do not know enough about specific relations between such indicators and a final impact, and thus about the optimum target values of the indicators.

The *quality of information* base and production can be partly measured by compliance with what is considered a 'good practice'. GRID-Arendal for instance, has used a checklist for an electronic state-of-the-environment report (Denisov et al. 2000) to evaluate the technical quality of national and urban reports. Positions included in the checklist were derived from a user analysis of state-of-the-environment reports (see box 3.4) and reflect general knowledge of how electronic information is read and can be made effective. A more general checklist for environmental reporting was published by the European Environment Agency (Kristensen et al. 1999). Methods exist for assessing some aspects of suitability of environmental monitoring systems for particular purposes (Gilbert 1987). Various assessments of environmental information systems include many potentially impact-relevant components, in particular on the *institutional* side (Simonett 1994, OECD EIS, CEC 2000, Anderson et al. 1999). Manuals on public participation or for example the text of the Aarhus Convention (Convention... 1998) may also serve as reference points for assessing the quality of the institutional base ■.

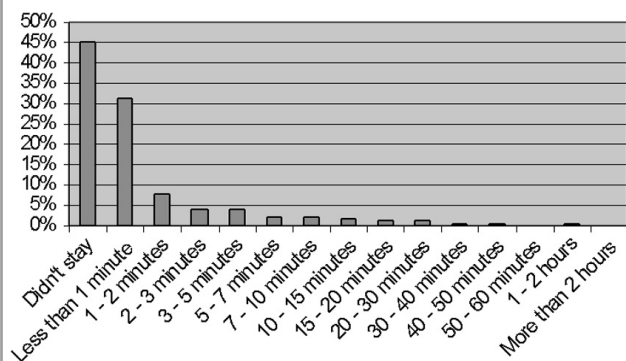
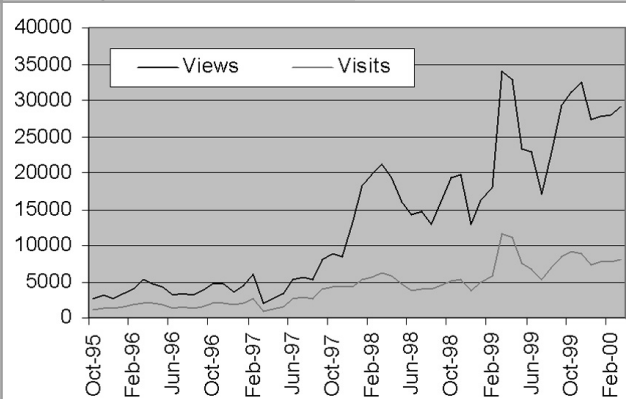
Actual sales and access data from libraries, shops, the Internet, etc. indicate if and what information is being *demande*d, *accessed* and *'consumed'*. However, 'more space or air time does not mean better or more information or knowledge (although having more room available for printing, showing, or transmitting news about environmental issues, does improve the chance for audiences to receive the messages)' (Centre d'Estudis... 1998). Boxes 3.2 and 3.3 contain examples of how usage statistics can help assess and possibly re-focus the way information is served on the web ■.

'Research conducted by the Global Environmental Assessment Project at Harvard University looked specifically at the practical impact and effectiveness of global environmental assessments. Three characteristics which emerged as most important in distinguishing effective assessments were *saliency* (the perceived relevance or value of the assessment to particular groups); *credibility* (the perceived technical authoritativeness to particular constituencies, largely in the scientific community); and *legitimacy* (the perceived fairness of the assessment process, largely in the political community)' (Scott 2000).

'Objectivity... can be simply understood as "what scientists say", instead of "what different sources say, including scientists"... In the first case, objectivity would be measured by the number of scientists consulted or the prestige of the institutions where they work. In the second one, the emphasis would be placed on the deconstruction or opposition of scientists' arguments by other groups such as NGOs' (Centre d'Estudis... 1998).

Haklay (2000) also contains good examples of how web usage statistics could be put to good use. This compared to currently still prevailing approach where web traffic and the volume of downloaded information are the primary measures. In fact very sophisticated methods for tracking and analysing how people read information on the Internet exist (Rushkoff 1999). Altogether the idea of moving from measuring volume to measuring attention devoted to information (Rushkoff 1999, Thorngate 1995) seems to be gaining popularity.

Box 3.3 About web statistics as measures of impact



The relevance of web statistics as a quantitative measure of the impact of the information is a complicated issue. There is a strong need to be able to differentiate between humans and “non-humans”. For example, it is difficult to judge how much of the increase in views and visits over the last years are due to robots and agents, as compared with humans. Related to this point is the time the visits take. The figure shows that 45% of the visits to the Baltic Sea Regional GIS web site (reaching up to 10,000 per month by early 2000) did not stay, and that additionally 31% only stayed less than one minute. If one considers visits longer than 1 minute as ‘real’ human users, then only 24% of the total number of visits are represented by this category. Furthermore, concerning the downloads, it appears that one download can be represented by up to 10 or more views in the NetTracker generated statistics.

Source: Langaas and Ahlenius 2000

Box 3.4 User conference assesses electronic reports

In 1998, the EU/Phare and GRID-Arendal assisted countries of Central and Eastern Europe to prepare Internet versions of their state of the environment reports. After 10 national reports were distributed on a CD-ROM at the Aarhus Ministerial Conference, a follow up Executive Seminar was organised to discuss them as well as needs and expectations related to SoE reporting on the Internet. The question “Reporting on-line: for whom?” was the main subject of the seminar. In addition to SoE producers, the seminar brought together representatives of target groups such as decision-makers, journalists, teachers, students, and scientists.

Evaluation of the electronic SoE reports of the PHARE countries

Arendal, 7 September 1998

Do you find information useful? Is it relevant? What is missing?
 How is the information presented text-wise? (Too simple, too complicated, can you compare the reports?)
 How is the information presented in graphics and maps?
 Are graphics explained enough?
 Are you happy with how you can find your way in the reports?
 What else would you like to comment on? What changes would you suggest for the structure, the contents?

User comments and internal feedback were summarised in a checklist that has since become GRID-Arendal’s standard tool for improving the quality of electronic SoE reports.

Source: Denisov 2000

Even the way a copy of a publication that was used looks like can be a measure of ‘consumption’, and thus of possible impact ■.

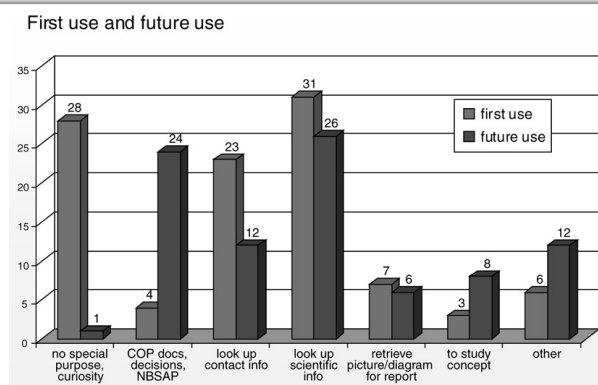
‘... I happened to be using one of the Heads of Function’s offices. Not only was their copy of the Coastal Report in pristine condition, but I could not get it out of the magazine folder it was in! This strongly suggests it does not get used. I have noticed that people with well-thumbed copies tend to keep them on the shelf just above their desk rather than out of reach in a cabinet... I have certainly noticed several ‘perfect’ reports shelved out of reach in private offices and I do wonder whether some of these could be put to better use’ (Wolfenden 1999).

Users themselves can say a lot about whether information in question is *wanted, accessed, seen, read, understood and used*. Therefore, various user-focussed studies are central in evaluating the impact of information. Both the production phase (how attractive the contents is, if the process of production is acceptable for the users, etc.) and the communication phase (do users look for this information; do they re-use it) could be evaluated in such a way. Boxes 3.4 and 3.5 are examples of studies designed to find out how specific information products were received and perceived by their users. Other accounts of similar user surveys, both

Box 3.5 Evaluation of biodiversity CD-ROM

In 1999, GRID-Arendal was commissioned by UNEP to produce a CD-ROM containing information on the state of biodiversity in Central and Eastern Europe. In addition, we collected text documents relevant to the biodiversity convention implementation process. Dissemination was primarily done through personal delivery at the two major meetings of the parties to the Convention on Biological Diversity. After the meetings, the CD was sent to a wide number of NGOs in the region and handed out at personal meetings to donors and international workers. The contents of the CD-ROM were also published on the Internet.

The purpose of the e-mail user survey and telephone interviews was to get a better idea of who the different users of this particular product are. The questionnaire was sent out to 822 persons and returned by 90. The interviews focused on the usefulness and quality of the contents and the habits of the respondents in using electronic tools to get information. In summary, it seems that the CD has fulfilled the expectations of both producers and users. Though needs varied, none of the parts of the CD were perceived as unnecessary. The CD was in the great majority of cases used more than once, 80% of the respondents intend to use it in the future (see the figure).



Source: Claudia Heberlein (details in annex 2)

retrospective and forward-looking, are available in the literature (Wolfenden 1999, Haklay 2000, Partanen-Hertell et al. 1999, Centre d'Estudis... 1998, Rucevska and Langaaas 2000, McConnell 1995, Moxen and McCulloch 1999, Karpov 2000, Gromov et al. 2000).

The fact that information is attractive or unattractive to audience-oriented 'brokers' like the media is indicative of a potential of this information to attract the attention of the audience, and thus of an impact potential. (This is also discussed in the next chapter, e.g. box 4.5).

The rates of *re-use* or *re-cycling* of information can be measured by the frequency of reference to it in various publications, personal communications, decisions and policy document. (For scientific literature various 'citation indices' are routinely calculated and widely used, e.g. Kostoff 1997). This is a very attractive indicator that is often used, although compiling comprehensive and meaningful records of it may prove challenging.

As indicated in the beginning of this chapter, it is possible to find both anecdotal and quantitative evidence of the terminal 'physical' impact on the environment. We should continue to look for such evidence, hoping that conclusions that are more general can be derived in the future.

Increasing the impact

After looking at the complexity and imperfectness of the methods available for impact analysis, taking concrete steps to increase the impact of information may seem overwhelmingly challenging. Indeed a theoretically ideal scientific approach with subsequent reverse engineering would require a precise knowledge of desired objectives (what impact, where, in which way, etc.) and how specific attributes of an information and communication process relate to final environmental impact. Yet, on a simpler level it should be possible to formulate at least some general principles in terms of 'dos' and 'do nots' so that one could avoid major mistakes that reduce the potential for making an impact ■.

4.1 Think about it

Probably the most important element that will increase the potential impact of information is trivial: to always think about it when designing and implementing the information process (box 4.1). Amazingly many information systems and publications, at least in the public domain, seem to be designed with no usage perspective in mind, on a completely supply-driven basis. If information is released not just because it is incidentally available and in whatever form turned out convenient for publication, but because its producer has at least a slight idea of who can use the information, and how and why it is useful, then there is a better chance of success ■.

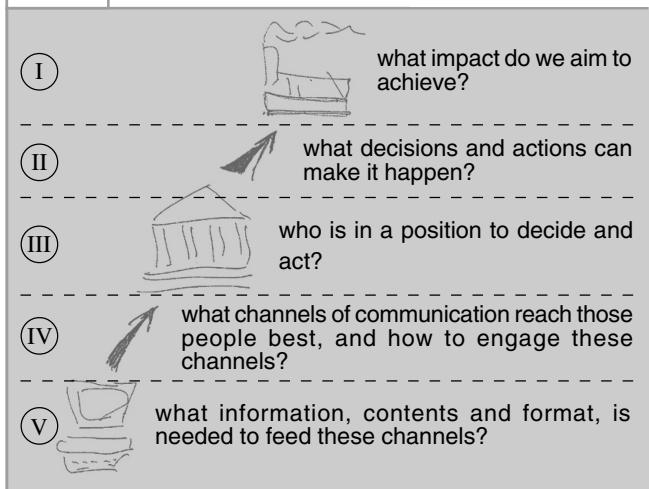
4.2 No garbage in

Content will never cease to be a critical element. Although it is possible to cause a temporary impact with totally wrong information, the effect most likely will not last when thorough information becomes available and widely known (see discussion in section 2.3). Another crucial component

The following discussion continues and complements the discussion of issues essential in the context of achieving the best impact of environmental information in (Christoffersen et al. 2000), see annex 1.

This is certainly a commonplace in the world of commercial publishing but is still not properly acknowledged within publicly funded organisations.

Box 4.1 Disassembling the chain



besides technical quality is the credibility of the information, and this to a large degree depends on the 'institutional' nature of the information process: users of information need to trust in how information was assembled, analysed and delivered. A source should be well recognised, and ideally, major users should have a possibility to participate in controlling the quality if not in giving substantive inputs (see sections 2.4 and 4.5): 'A failure to have timely public debate about controversial issues can widen the gap between the public and governments, which can then lead to mistrust. Trust in the sender of information is a key element in how it is received and used' (Macnaughten 1998 in EEA 1999).

4.3 Know your users and choose your messengers

If end users (fig 2.1) are supposed to be reached directly, an information product should be both accessible and attractive for them. This requires the knowledge of the needs and capabilities of the intended users so that information can best suit their interests and expectations ■.

A study of the use of UNEP's publications in Canada concludes: 'If UNEP is sincere in its desire to write books that include the general public as a target audience, it should define who 'the public' is, develop writing and publishing guidelines for it, and apply those guidelines to books destined to that readership' (Boyd 1994). The OECD workshop on sustainable development indicators 'highlighted... First, the importance of a pragmatic approach for developing indicators (i.e. that they are useful to decision-makers and to stakeholders)... Second... work on communicative indicators needs to be linked more closely to an understanding of citizens' interests and information needs' (OECD 1999).

Box 4.2 Different designs target different users:
environmental activist vs governmental web sites

	Activist		Government
Strategy	AGGRESSIVE	NEUTRAL	COOPERATIVE
Goal	INFORMATIVE	BALANCED	MOTIVATIONAL
Interactivity	LOW	MEDIUM	HIGH
Wealth of information	LOW	MEDIUM	HIGH
Appearance	AMATEUR	SEMI-PROF.	PROFESSIONAL
Organizational structure	AFFILIATED	SPONSORED	INDEPENDENT

Source: Bauer and Scharl 2000

Although a lot is known about what kind of information reaches people efficiently and what does not (e.g. Rekacewicz 2000, Clark 1997, Denisov et al. 1998, Bauer and Scharl 2000), the challenge in any concrete situation is:

- to identify and study user groups (who are they? who do we want them to be?);
- to study their needs and preferences (what do they need? how do they want it? – both the way users see it and what other evidence suggests ■); and,
- to incorporate this knowledge and choose the right communication strategy (boxes 4.2 - 4.4).

Very simple things can make publications user-friendlier. In particular, it is often underestimated how easily people get bored or loose interest, and how powerful visual means of communication can be.

Furthermore, those who may be good at assembling information are not always equally good at delivering this information to users. The study of UNEP's publications in Canada suggests among its conclusions: 'In selected cases, drop the pedantic, data-collection approach to publishing and actually **write** the books, a feat more likely to be accomplished by hiring a professional writer' (Boyd 1994) ■.

'...Decision-makers are usually quite bad at judging how they made decisions. Instead they construct stories that make sense of what they did. Thus, it is foolhardy to trust self-reports of decision-makers in determining how information affected their decisions...' (Thorngate 1995).

From the same study: 'UNEP may want to consider publishing Earthwatch information... in newsletter format as an effective way to get its data to public servants and political leaders... [The] following should be paramount considerations: written and produced by a professional communicator as opposed to a scientist or bureaucrat; concentrate on Earthwatch information and publications as opposed to UNEP operations; brief, simply written articles..' (Boyd 1994).

Box 4.3 Communication strategy for South African state-of-the-environment report

It was important to develop a communication strategy early on in process. The information contained in the SOE Report was disseminated using different media and formats.

Internet: full report, overview, additional resource material, city reports, policy papers	Currently used at 4 universities and 1 technical college as post graduate course material; Internet hits vary between 2000-3000 hits per week.
CD: full report, overview, additional material, city reports, GIS data sets	480 CD's distributed (250 initially at launch, rest on request).
Printed overview document: in 5 languages	4000 English, 500 Afrikaans, 300 Xhosa copies distributed. Aim was to have a less technical report available to general public. In reality it is still too technical and translation in Black languages not as useful as initially thought.
Poster: snapshot of contents of the report	500 copies distributed.
Reports in the press, mostly short articles	Key statistics from the report carried in 5 newspapers (12 articles in total). Found to be very effective. Some reports were sensational and several radio stations contacted the Ministry for more information.
Radio both during the time leading up to the launch and following the launch: live interviews on the air and a panel discussions with listeners phoning in questions	Key findings of national report discussed on three national radio stations, and four regional stations with regard to city reports.
TV	Before the launch to make people aware that the report is being compiled. During the launch national TV covered the report on two main news bulletins, a morning talk show and more comprehensively in an environmental programme.
Video: twenty minutes summarising the main findings of the report	This generated considerable interest and requests for copies of the video. 30 videos distributed (only on request).
Office of the Minister of Environmental Affairs and Tourism	The Communication Section played a crucial role in disseminating the information by actively promoting the report and mobilising the press. In the weeks following the release, the Minister used every opportunity to publicly discuss the importance of the report and to share some of the key findings.

Source: Pretorius 2000

Many studies indicate that traditional mass media like newspapers and TV are still the main sources of general environmental knowledge despite of the growing usage of the Internet. 'An information system is ... viewed as a 'narrow band' vehicle, which although capable in providing detailed information about a specific topic, cannot compete with 'old media' on the general provision of news' (Haklay 2000; some examples and comparative statistics are also presented e.g. in Centre d'Estudis... 1998, Partanen-Hertell 1999, Rucevska 2000). Even high-ranked bureaucrats and politicians may be better reached through the media than through their advisers and supporting staff ■, although the latter channel works too (Boyd 1994). NGOs, thanks to their high motivation and often considerable technical expertise, are certainly good at delivering messages to the public ■.

Similarly to different end-users having different needs, each 'filter' has its own requirements of information it finds attractive and worth engaging. Information needs to be optimised for particular channels of communication. What is good for the media, may not be attractive at all for NGOs or technical analysts, and vice versa (box 4.5; van Kampen, undated) advices on how to best approach the mass media, while Centre d'Estudis... 1998 discusses in detail the character of present-day environmental journalism).

4.4 Stay on the ground

For information to be used, it should be relevant; its message should concretely relate to peoples' interests and decisions' needs.

Local conditions, health and food safety are still popular environmental subjects among the general public. Even if the environment goes down the drain, only few people would know how it relates to their private lives, what to do about it, and why do it at all (purely moralistic stimuli

An observation from debates during 'Question Hour' in the Parliament of Norway some years ago is that the overwhelming proportion of environmental issues raised was those covered by the easy-to-read newspapers, such as VG and Dagbladet (Helge Onstad, pers. comm.).

In general however one should also take into account an often 'deep-rooted mistrust that often characterises relations between organisations and economic sectors... For example, ... housing and community development organisations are highly suspicious of the environmental information provided by industrial sources. On the other hand, ... industrial organisations are highly suspicious of the information disseminated by voluntary environmental groups... Many of the organisations involved in the provision of environmental information distrust and disapprove of one another' (Moxen and McCulloch 1999).

Box 4.4 Targeting right to win over packaging tax

In 1994, the Norwegian Parliament imposed a "basic tax" on one-way packaging for drinks that effectively stopped plans to introduce one-way plastic bottles, cans and glass bottles in the market. This also made establishing a collection system for one-way packaging unprofitable which resulted in even higher tax based on return rates. The tax was challenged several times during the nineties but is still in place (although its effect was weakened by the introduction of a can-collection system in 1999).

Before the decision was made by the Parliament, several groups had tried to influence the future packaging tax system. The industry supported the introduction of *recyclable* one-way packaging and argued for its environmental benefits. Labour unions feared brewery centralisation and supported *reusable* packaging, arguing for decentralised and labour intensive production. Environmental NGOs argued that reusable packaging was more environmentally sound than recyclable alternatives.

The industry had managed to win influence over the Government whose final proposal was not to discriminate between reusable and one-way packaging.

Labour unions and environmental NGOs collaborated targeting instead the financial committee in the Parliament, recognising that the position of the committee would be the position of the Parliament. Most of the time was used on parties that could influence the outcome, and little time was spent on sympathetic parties and those clearly supporting the industry. Information products were short, targeted, addressing the essence of the Government's proposal and outlining alternatives in a clear "parliamentary language". As a result the Labour party in the Parliament took a position opposite to its own Government, and industry was caught by surprise.

Source: Morten Wasstøl, pers. comm.

seldom work nowadays). A better message is therefore not just 'Too little water left', but '...turn off your tap', or even 'be water wise, it makes ¢ents!'■.

Same are 'professional' decision-makers: '... S[ea] L[evel] R[ise] impact models have to become erosion-impact models, property-loss models, tax revenue-loss models, beach nourishment-cost models, shoreline-hardening models, wetland-loss models. Short of that, their need to be algorithms or intermediary models that connect SLR impacts and response options with the actual decision problems as they present themselves to governmental and private decision-makers' (Moser 1999).

A sticker by the Canadian Interdepartmental Advisory Group on Water Conservation at Federal Facilities.

Box 4.5 What kind of messages are they after?
The media
What is news?

- near in time, space, culture
- affects many
- an easy conflict
- unexpected
- negative

Don't say – show it!

- visualise
- concretise
- quantify
- personify

Source: Lars Haltbrekken and Audun Garberg, pers. comm.

Non-governmental organisations
What

The content is more important than the form. A large report or a fact sheet could both be useful, but mainly because of what is presented.

Clear statements from people or institutions generally considered as trustworthy.

Information products that don't only give conclusions, but also data behind.

Information on reasons behind, and the effects of environmental problems.

Information that decisions are based upon.

Why

An important source of NGO power is to influence perception of reality through arguments based on substantive information.

Analysis and arguments can build on such statements. When the IPCC calls for radical cuts in CO₂ emissions, it is easier for a NGO to argue how this must be done.

Different conclusions may be drawn from the same data. NGOs prefer making their own lines of argument.

NGOs work to change practices. Information on impacts strengthen their cause, and information on driving forces explains solutions.

Policy makers rely heavily on the analysis and advice of the bureaucracy. By getting access to the background of decisions, NGOs can target policy makers with alternative analysis. Thus, a transparent public sector benefits NGOs.

Source: Morten Wasstøl, pers. comm.

Ministers

When a policy advisor prepares a cabinet brief for a Minister, this one-page brief should include:

- what is being proposed;
- why this should be done;
- what exactly will be the effects of this decision.

Source: Dan Claasen, pers. comm.

Finally, proposed actions should be in principle within the reach of those who are encouraged to act ■.

4.5 Involve

It may be easier to organise a process with only few participants, and at times, this can be well justified. However, more often an open dialogue has enormous power to both ensure the best possible information and boost its impact (section 2.4). It seems likely that there may be high impact benefits of opening-up information processes for broad participation.

One of important recent developments in this regard is the initiation of the Aarhus Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters whose signing started at the Ministerial Meeting 'Environment for Europe' in Aarhus, Denmark in 1998. The Convention is also open to non-European countries that puts it in a position of potentially the most powerful legal mechanism that was ever available internationally for regulating daily interactions between producers and users of environmental information. For all interested in the impact of information it shall be most interesting to follow the implementation of this convention, which puts into practice ideas which have been broadly endorsed by the international community, since the 1992 Earth Summit.

'It has been assumed that "environmental empowerment" can be stimulated by public agencies by raising awareness of personal capacities to have an impact on social outcomes. This has been particularly noticeable in some areas such as recycling, green consumerism, and urban transport. However, media campaigns searching for citizens' co-operation in public and private initiatives to abate environmental problems have often not fulfilled original expectations or have even ended with the opposite results. Many campaigns have been launched before the necessary institutional and technological arrangements have been sufficiently set up... On many occasions, this has led to public disappointment and distrust and as a consequence, future opportunities for positive environmental involvement have not been taken advantage of' (Centre d'Estudis... 1998).

Box 4.6 Principles of effective dissemination
of environmental research

'Key principles of research dissemination suggested by the... experiences [of the **UK Global Environmental Change Programme**] include the need to identify and concentrate on key, short messages; to use simple, non-specialized and clear language; and to target messages appropriately to different audiences.'

'Research conducted by the **Global Environmental Assessment Project at Harvard University**... [concluded that] factors that lead to effective assessments (through the proximate pathways of credibility, salience, and legitimacy) include historical context (e.g. whether the issue has yet emerged as high-profile), characteristics of the user or audience (a user's interest, capacity, and/or openness), and characteristics of the assessment itself (how the science/ policy interface is structured; how participation is determined; how uncertainty and dissent are handled) (Clark et al. 1999).'

'**Faulkner** concludes that in order to improve the knowledge flows from public sector research, 'policy should be geared to increasing the number of communication channels ... rather than the number of formal linkages ... Because of the 'bitty' and coalescing nature of knowledge use in innovation, much of the contribution of public sector research is not plannable at the micro level; all one can hope to do is to set up structures and cultures for this to happen... (Faulkner 1995).'

Brown highlights three conditions for useful interaction between researchers and practitioners or policy makers: clear presentation of research material, a sense of ownership among practitioners of the results of research; and the need for a suitable forum for communication (Brown 1992).'

'**Janet and Carol Weiss** summarise their findings as follows: 'Research is used when the topic is relevant, when it deals with an issue administrators can do something about, when it can be built into pending decisions, and when it is understandably written. Sometimes, four variables can get you far (Weiss and Weiss 1981 in Huberman 1994).'

'**Huberman**... argues strongly that a limited number of key variables of effective research dissemination can be identified that encapsulate most of the issues involved. These build on findings from a large number of studies and come under the general titles of: research context; user context; linkage mechanisms, predictors of local use; and dissemination effort. These are all brought together in a 'dissemination effort model' that can act as a framework that can be used to define the most relevant variables in a particular instance (Huberman 1994).'

Source: Scott 2000



Concluding comments

Over the last decades, there has been a growing interest in environmental information, as people have been sensitised to environmental problems. Considerable environmental information has been made available to the public at large for purposes of increasing general environmental awareness and for stimulating education. A driving motivating force behind these efforts has been to empower the public with knowledge that can help them make their influences felt on policy- and decision-makers in both the public and the private sectors. Environmental information can also be designed for more direct and specific uses for decision-makers and policy-makers. It can be tailored more directly to their own user needs.

This discussion paper starts by noting two driving forces behind these information demands: knowledge is power, and, time is money. Decision-makers want information that will enable them to meet public requirements and to demonstrate and encourage commitments to environment-friendly policies and consumer behaviour. They also see the potential benefits of cost-saving reductions in the timely availability and the efficient production of environmental information products.

Environmental information has become more economically valuable. This value is demonstrated by the increasing commercial interest in such information. Environmental information is gathered and supplied through commercial contracting, such as meeting legal requirements for mergers and acquisitions in the private sector. Commercial contracting for environmental information is also widespread in the completion of required Environmental Impact Assessments in many countries. It has also considerable political value. Environmental conscious voters are exerting considerable pressures on politicians and public administrators.

Environmental information available in the public domain is the main focus of this paper. It is often difficult to assess its impact. In an attempt to do so, the paper begins by discussing different types of environmental information. The chain from production to impact is examined in several steps – through exposures in different intermediaries, to forming awareness and public opinions, for catalysing environment-friendly laws, policies, organizations, investments, consumption patterns and values. With quite a wide variety of time lags, it may perhaps eventually be possible to detect impact in the form of lower pressures on the

environment (do trees feel the difference?) and by clear demonstrations of environmental viability in the larger context of sustainable development. Other less direct measures concerning the quality of information production and dissemination process can also be influential in determining whether tangible environmental impact is likely to follow.

The communication function needs careful attention. The quality of communication either substantially enhances or reduces the usefulness of good quality information.

The potential of effective communication techniques through information ‘brokers’, such as mass media and NGOs, should be carefully explored. It is also recognized, however, that too intense communication can have a detrimental effect. The public may easily tire from repetitions of the same invocations. It demands updated news and more precise information over time. In addition, just as political propaganda can undermine democracies, so can single issue or narrowly focused environmental information undermine the ability of the public to make truly conscious and responsible decisions.

Another important point arising from this paper is that the possibilities for impact success are often achieved if an information product is targeted to the specific needs of the intended user group(s). It is not only wise, but also effective and cost-efficient, to identify very clearly the intended user group(s) at the design stage of an information product. It is now conventional wisdom that information products must be user-friendly. In order to be user-friendly we need to be clear up front who we expect to be the users. Information products should include mechanisms and methods for user assessments, before and after they are produced and disseminated. Ensuring and measuring the impact on decision-makers – whether through direct or indirect effects – require the designers of each information product to think carefully the various steps in the production-to-impact chain discussed in this paper. At the design stage to articulate a clear communication strategy for each product, planning the updating requirements that decision-makers need, analysing the cost implications of the various options open at the design stage for achieving intended impact.

Public participation has been a hallmark of the environmental movement in recent years. The Earth Summit in

Rio in 1992 pointed to the need for governments to provide open access to environmental information and to facilitate opportunities for public participation in decision-making. An important point in this paper is the growing evidence that public participation in information gathering and in the assessment of information needs can substantially improve the likelihood of positive intended impact on decision-making processes. More recently, the Aarhus Convention on Access to Information, Public Participation in Decision-Making, and Access to Justice in Environmental Matters (1998) has dramatically raised the stakes in this regard. A European initiative, the convention is also open on non-European countries. Since it reflects global aspirations noted in many different international forums, the implementation of this convention may set new international standards and trigger new practices that go far beyond the more traditional approaches.

It also brings attention to the need for a reassessment of the old UNEP-GRID system paradigm. It is no longer enough to focus attention on being an intermediary between one set of producers, say scientists, and decision-makers in government and business. The new key point is to find effective methods of communication of information as well as to include broad-based and pro-active public participation in the intermediary functions between producers and final decision-making users of environmental information, without reducing the quality and credibility of such information.

As noted in this paper, it is not enough to tell people repeatedly that there are environmental problems. Initially this may catch media interest and political attention. In the longer run information on concrete ideas of what to do in order to resolve environmental problems will also be needed. This leads to the final observation of this paper. Many environmental issues cannot be resolved without putting environmental information in a larger context, including economic, social and cultural information. Both the Rio Declaration and the Agenda 21 document quoted in the opening part of this paper refer to a larger sustainable development context. This important topic needs much further attention and examination.



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Annexes

1. Essential issues
2. Case study: evaluation of biodiversity CD-ROM
3. Analysing the usage of the world-wide web
4. Coercive communication: dangers and alternatives



Impact of Environmental Information on Decision-Making Processes and the Environment

Annex 1

Essential issues

Nickolai Denisov, Otto Simonett and Leif Christoffersen

Published earlier as part of the Issues paper prepared as a background for GRID-Arendal seminar on the impact of information, 22 May 2000

In this chapter GRID-Arendal staff is presenting eight issues that are becoming increasingly important in the context of assessing and improving the impact of environmental information in the public domain.

We believe that by asking and answering such essential questions we may be able to get a step further in knowing how good we are and how we might do better.

Besides introducing each of the emerging issues, in this chapter we have chosen to include some counter-statements that we have called “impact provocations”. Looking at both the “positive” and the “negative” sides can help us better understand the issues and enable us to gather arguments to disprove the accusations when they are wrong, and to help us correct the course when they are not.

GRID-Arendal’s Impact Provocations – can we prove the contrary?

Because we primarily operate in an international bureaucratic environment we have difficulties adapting to professional standards of the information business.

With funds mainly coming from governmental or inter-governmental agencies interested in environment and development in general, our relation to the end-users of information is distant and a bit skewed. They cannot be considered our real clients, since we do not depend on their contributions for our operations. We are too quickly satisfied being the “one-eyed amongst the blind”.

**Can we disprove the provocations in the boxes below?
Is this something to think about?**

a recognition of institution

Different users may have different expectations and requirements as to the source of information that is trusted, accepted and used.

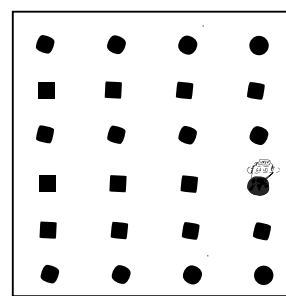
National authorities often want it to be endorsed (rubber-stamped) at the right political level.

Inter-governmental organisations, including the UN, may balance between this approach (they need acceptance from member governments) and the need to base their assessments on high-quality sources independent of political influences.

The media and NGOs will more often appreciate information if they believe that its source has the right expertise and is not politically biased, or - if it is biased in the “correct” direction.

The scientific community normally needs the source to be fully recognised by the scientific world. Sometimes even the fact of belonging to a particular school of research makes a difference.

When the “institutional” requirements of information users are not met, there is a considerable risk that a message will not be taken seriously, regardless of its contents, nov-



Source/Club unknown to the outside world

As an organisation, we are primarily known within our own world: UNEP-related organisations and maybe some individuals working for governments and in academia. Beyond this group we are not widely known, in particular among the general public, NGOs and the media.

erty or quality. Thus it will have little impact within a particular audience.

Besides the nature of the source, people tend to react to more familiar and well-established brands. The very fact that information comes from a well-known organisation with a seemingly good reputation is for many a sufficient guarantee of quality. On the other hand, there is a fair risk that information from unknown or unrecognised sources will be ignored.

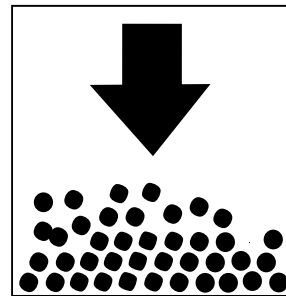
d targeting the public and decision-makers

Information is useful if it improves our understanding and knowledge and helps make decisions. Otherwise it only contributes to “noise”.

General-purpose information products that somebody *might* perhaps use some time in the future, are easier to make, but have lesser impact than information addressing very concrete needs for decision-making processes.

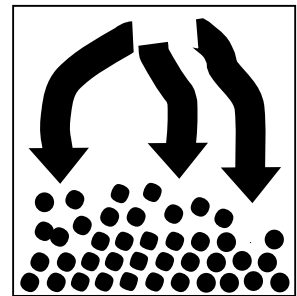
Unless we know how our information will be *used* or how we want it to be used, we can hardly make it *useful*. On the other hand, when we know what kind of decision-making processes our users are involved in (for example, voting at the Conference of Parties to an international convention), then it becomes possible to tailor information to specific uses.

This begs the question: What kind of environmental action, or impact, do we seek? Single issue campaigns which focus, for instance, on themes related to nature protection, may be easier to target and to implement than more complex and more holistic sustainable development goals, which must take into account multiple issues relating to species and ecosystem conservation - but also many human (economic, social and cultural) needs.



Not targeting user groups

Because general information products are mainly supply-driven (our funding is not coming from end-users) there is little need to target information to specific users. We do what we think is best and do not bother very much about tailoring products to specific user needs.



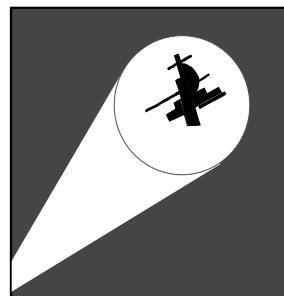
The need to be specific and to link information to concrete action has long been recognised in marketing, propaganda, and advocacy campaigns, and among many NGOs. One of the practical lessons from studying the impact of environmental information is that in order to be interesting and relevant, it should be presented within a local or even individual context. Another lesson is that the media are still among the most powerful vehicles for delivering information to people, both in the streets and in the parliaments.

e packaging information

In the past, when explorers and colonists reached tropical coasts they learned that they got the best deals with bright coloured ribbons. The world has not changed much. Bright colours and attractive packaging make a huge impact on sales and distribution policy - for everyday goods, as they do for environmental information products.

Different products with the same content may be received differently depending on how attractive – or unattractive – they are packaged. A publication that is nicely designed, laid out and illustrated will be much better received, and thus have a higher impact than one that is ugly and dull-looking.

In a similar way, interesting and lively text written by a professional writer rather than a bored bureaucrat has a much bigger chance to catch attention. Surprisingly enough, unlike commercial publishing, the public information business does not seem to understand this, since this approach is not much utilised.



Gloss, gloss...

Since people no longer have much time to read, successful publications seem to need attractive covers, nice layouts and some catchy graphics inside. Instead of spending time and money on the contents that no one will ever care about, we invest in design. Thus we save ourselves from hard work in analysing the contents, and provide happy readers with another good-looking publication they can put on their shelves – or on coffee tables.

How much packaging is needed to camouflage the lack of good contents is another question.

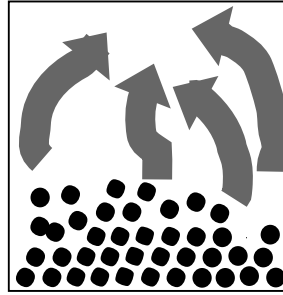
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how do the users feel?

The best way to find out what the users of information feel about it is to ask them.

Although some information producers do make attempts to collect user feedback, this is seldom done on a regular basis. One of the main reasons may be that end-users of information are seldom significantly influencing work agendas. Producers are more often influenced by other “important” political, financial, bureaucratic and “professional” factors. (In Europe this may change with the introduction of the Aarhus Convention on access to environmental information.)

Existing techniques for collecting user feedback range from inserting feedback forms in publications to interviews, large-scale surveys and the analysis of web statistics. Such analyses exist for environmental publications, but are not frequent.



Feedback only randomly collected

Feedback is not systematically collected from users through our products. Even randomly received feedback may not be effectively collected. This may be due to the fact that the **users** are not really the ones that provide our **funding**.

A deeper question is whether we can measure how far the information changes users’ attitudes and behaviour. The answer depends on our knowledge of what users really think – not what they say they do - and what kind of information triggers behavioural changes. This is an issue that supermarket chains, Internet shops and advertising agencies would love to “solve”.

g

effective capacity building

Decentralised networks of producers and “brokers” of environmental information, such as UNEP’s country-based information networks, rely on individual nodes.

When such “information shops” do not exist or when their capacities to deliver information are limited efforts are needed to build and strengthen them.

This requires addressing various organisational, financial, technical and cultural challenges. If the process of “capacity building” is successful, the result may trigger a dramatic increase in the impact of two-way information flows: on the global community through easier access to local and national information, and, on local audiences through access to considerable global and regional information.



Functional units or “still-born babies”?

“Information shops” that we help to set up at national levels are seldom capable of long-term cost-efficient operations. They enjoy little support from UNEP’s “political” counterparts, lack understanding of what they are supposed to do, and are completely dependent on continuous guidance and funding from us. Run by small teams or even single individuals, they are very vulnerable to change: if a key individual leaves, all may have to start over from scratch. The “shops” may be able to generate good information, but they contribute relatively little to its effective dissemination, and even less to its use.



Annex 2

Case study: evaluation of biodiversity CD-ROM

Claudia Heberlein

Background and context

In December 1999, GRID-Arendal was commissioned by UNEP's Regional Office for Europe to produce a CD-ROM containing information on the state of biodiversity in Central and Eastern Europe (including the countries of the former Soviet Union). In addition, the CD was to contain regional information and background documents about the meeting for which it was produced, the Conference of Parties of the Convention on Biological Diversity (COP) – regional preparation meeting in Riga in February 2000. After the Riga meeting, the CD was translated into Russian and the new edition disseminated to the participants of the COP in May 2000.

Production

In the course of two months all 27 ENRIN national focal points of the region were contacted and asked to produce their country's state of biodiversity report following common terms of reference. As a result, we received 22 country reports. In parallel, based on regional data from public sources we added a number of regional maps. We also collected text documents relevant to the biodiversity convention implementation process, such as national biodiversity strategy and action plans and national implementation reports, where available in electronic format. Sources were the Internet, personal contacts at the Convention Secretariat, the Biodiversity Service for CEE at UNEP-RoE, ECNC, REC, and others.

Dissemination

Dissemination was primarily done through personal delivery at the two meetings the CD was produced for. After the meeting, the CD was sent to a wide number of NGOs from the region and handed out at personal meetings to donors and international workers. To date around 480 CD-ROMS (out of 500) of the first and 2200 CD-ROMS (out of 3000) of the second edition have been distributed in total.

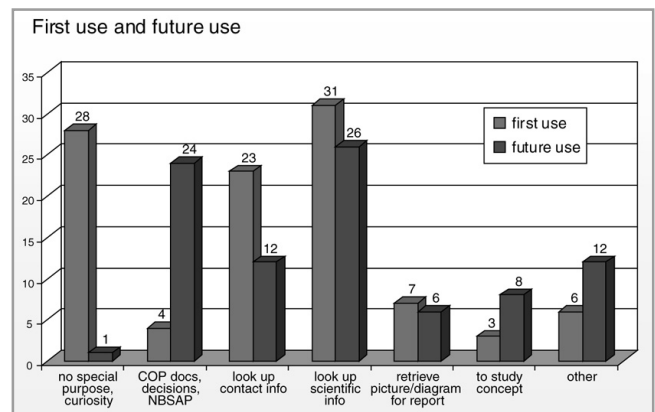
ENRIN: UNEP's Environment and Natural Resources Information Network

Copies can also be ordered on-line. As of Nov.17 only one copy was ordered.

The contents of the CD-ROM were also published on the Internet on the first day of the conference in May and were advertised on the top page of the GRID-Arendal homepage.

Evaluation

The purpose of the evaluation was to get a better idea of who the different users of this particular product are. The interviews conducted touched upon the usefulness and quality of the contents and the habits of the respondents in using electronic tools to get information. In summary, it seems that the CD has fulfilled the expectations of both producers and users. Though needs varied, none of the parts of the CD was perceived as unnecessary. The CD was, in the great majority of cases, used more than once. 80% of the respondents intend to use it in the future. The following graph gives an impression of the specific actual and intended use of the CD:



E-mail user survey

A questionnaire was sent out to all participants of the Conference of Parties of the Biodiversity Convention whose e-mail address was available, to all NGOs that had received a CD-ROM from UNEP's Regional Office for Europe, and to several other recipients of the CD-ROM whose e-mail address was known.

The purpose of the questionnaire was to get a better idea of where the different users of this particular product come from professionally, institutionally and regionally (even though with the distribution at the COP the audience was already narrowed down to experts and decision-makers in this field) and how they use the product. An evaluation in the sense of what is good and bad on the CD-ROM was only touched in the last open question where the respondents were asked to give unspecified “other comments”.

The survey does not give a direct indication of the impact of the CD-ROM on decisions taken, nor on the effect an eventual decision had on the environment. But it gives some insight into how we can improve the structure and concept of a similar product in the future, how to target the product to the different user groups at stake, and, last but not least, it added to our experience in conducting surveys.

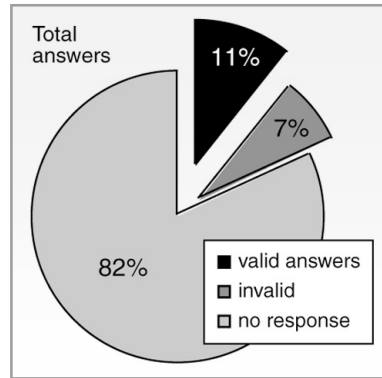
The table below provides an overview of the questions asked, and the topics they were intended to address. The third column contains comments on the actual usefulness of the answers judging from the actual results.

Question	Topic to be addressed by it	Explanation, comments
1. Your organisation and country:	Who are the users? What type of organisation do they represent?	<i>Since the users were chosen by ourselves, this question doesn't give many insights, but can be used to compare different categories</i>
2. Your position/function:	What level of decision-making is using the CD?	<i>Difficult to categorise: president of an NGO = Deputy Minister??</i>
3. Did you take a look at the CD-ROM when you received it?	Interest created by the cover	<i>No problems encountered, maybe it would have been better to ask: Have you taken a look at the CD-ROM?</i>
4. If yes, have you taken it out again and used it since? (make an X in front of the right answer) Yes, regularly Yes, once or twice No, never	Interest created by the first browsing: Are we able to create more interest with the contents?	<i>Important to ask this question, because it shows a reaction to the contents and eliminates the curiosity factor</i>
5. What did you use the CD-ROM for? - no special purpose, just out of curiosity - to look up specific contact information - to look up specific scientific information - to retrieve a picture or diagram to be used in a report or presentation - other uses (explain):	What types of information on the CD are used most frequently? What types of information could be extended in a future release, what seemed unimportant?	<i>Difficult to create categories for the 'other' section, although various interesting various uses were named, they aren't reflected in the evaluation</i>
6. Can you imagine using the CD-ROM again in the future? - if yes, for what purpose? (explain) - if no, why not? (explain)	Usefulness of the information contained Use of the information beyond curiosity	
7. Did you pass this CD-ROM on to someone who could be more interested or for whom it could be more relevant?	Outreach of the CD: do we reach more than one person with one copy? Is it perceived important?	<i>This is a problematic formulation, as a no can both mean I didn't find it interesting enough to pass on, or it is too important for me to give to someone else, or I am the person it is most important for</i>
8. If you hadn't received the CD-ROM, would you/your organisation be willing to pay for such an information product?	Commercial value of the CD	<i>This question was often misunderstood: the 'if not' was not understood properly, so that people didn't feel obliged to answer because they got the CD for free</i>
9. Any other comments?		

Results

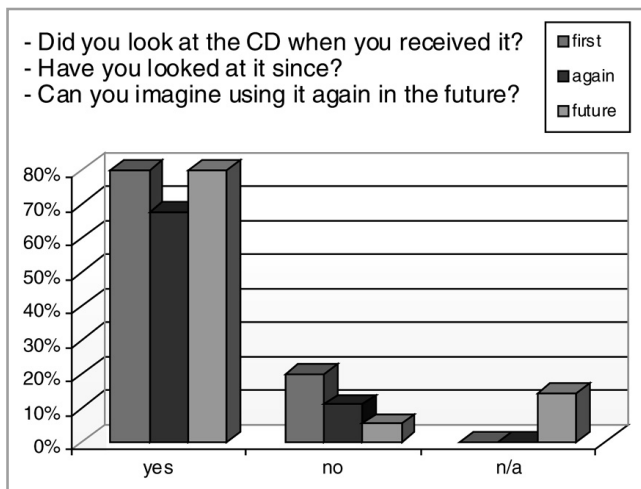
Answers

Of the 1097 questionnaires that were sent out, 200 went to wrong e-mail addresses, while 75 of the questionnaire recipients answered that they had not received the CD. Thus, a total of 822 persons who had also received the CD received the questionnaire. 90 or 11% valid answers came back. 58 or 6% answered to the e-mail without responding to the questions. These were partly auto-replies, but also personal answers saying they will answer later (and never did).



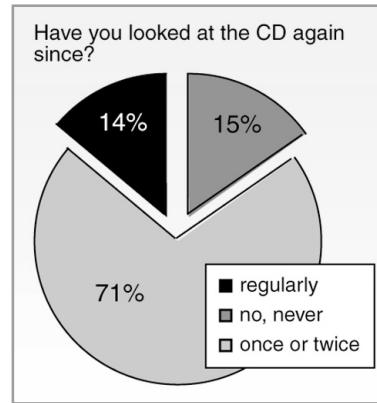
The respondents are distributed evenly between executive leaders, people with programme or project responsibility and consultants or advisors, with only few communication officers and other positions. Presumably, the representation of high-level officials at the COP was quite high, so it is not surprising that over a quarter of the respondents are executives.

Actual and predicted use



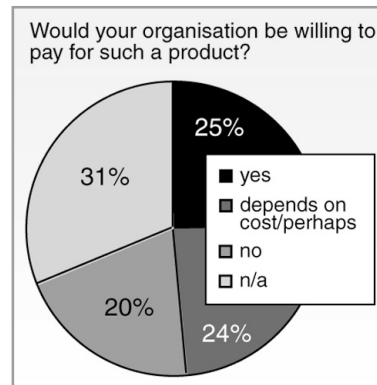
One indicator that the CD-ROM contains useful information for all user groups is that with negligible differences between the different groups, the attention of 79% of all users was raised at first sight of the product. 85% out of these have used it again at least once or twice, 14% even regularly, and around 80% can imagine using the CD ROM again in the future. The CD indeed contains 'information for decision makers'.

The least interest in using the CD again came from consultants and scientists (with only 64% yes), a sign that for



this group the information might not be detailed or specific enough. Were we to satisfy the needs of this group in particular, we would have to put more emphasis on adding additional layers of scientific information to the chapters.

With regard to both a break-up by organisations and regions of origin, there were again no significant differences. This is insofar interesting, as the regional information seems to have enough general value to be interesting for people from other regions of the world as well. This might be explained by the fact that the way the information is packaged (CD-ROM, maps and graphics, wealth of information) is still fairly new and attractive and that many looked at it as an example they would like to see repeated for their own region. (This was a frequent comment added at the end of the questionnaire).

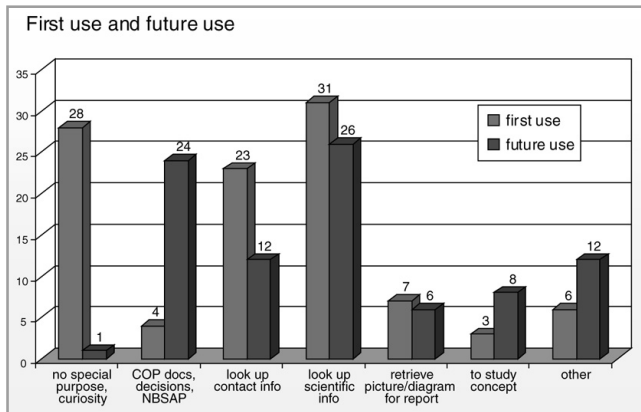


Another indicator of the usefulness of the product is the willingness to pay. On the proviso that several persons did not understand the question properly (31% didn't answer), the readiness to pay under certain conditions is still rather

high at 49%. Slight differences exist with regard to types of organisations, with the least willingness by international organisations and most by scientific institutes (This contradicts in a way the result of the above question where scientists (together with consultants) were those least interested in using the CD again.)

Specific uses

A clear distinction can be made between what the CD was used for in the first place and what the respondents foresee to use it for in the future. While naturally at the first use curiosity prevails, this category is practically nonexistent in the future uses. Popular both in actual and in future use is to look up scientific information, the core information from the producer's point of view. Contact information, important on the first look, loses a lot of attention in the future, while the users foresee to use the

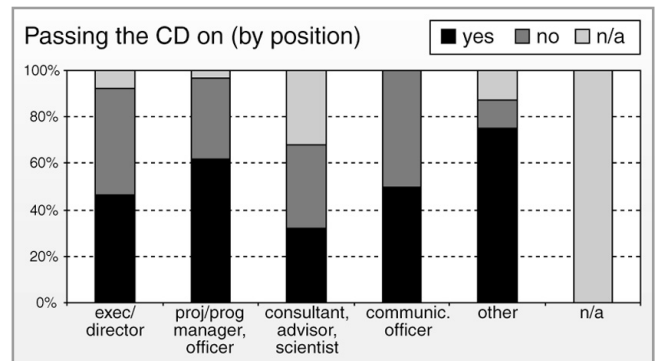


CD much more often to look up documents and reports connected with the convention meetings. This part of the CD was for the producers only seen as a side product, and much more efforts could have been put into it (although the effort possible was mostly limited by the resources and time available). In the future we might want to pay more attention to collecting this kind of practical information, as it seems almost as important as the actual country reports. Another intention of the producers was to provide graphic material to be used in presentations and reports, and this offer was used and is foreseen by the users to be used rather frequently as well.

Scientific information is most popular with scientific and international institutions. NGOs and governmental organisations are equally interested in CBD-related documents and scientific information. Executive and communications officers were most interested in scientific information while for project managers interest in CBD documentation prevails. To summarise, it seems that all types of information presented on the CD served its purpose and it is difficult to draw any conclusion as to how to modify the types of information to be included in this kind of product.

An indication on how broad the outreach of the CD is and how important it is valued for the organisation is given by the number of CDs that have been passed on to others. If an executive passes the CD on after having looked at it (which is in the most cases the case, as 80% of the respondents took a look at the CD), it can be interpreted as perceived useful and worth seeing by others. The same may apply to programme/project managers. The low number of consultants/scientists that had passed on the CD may be due to the fact that they either think it is best used by themselves (this was also mentioned in comments like 'because I'm the best to use it') or because they have no organisation behind them who it could be passed on to. All in all, 50% of the CDs were passed on to someone else.

In summary, it seems that the CD has fulfilled the expectations of both producers and users. It has a value beyond the first-sight positive effect the catchy design and



the handy format evoke. It contains useful and quality information that can be applied in various contexts.

From the types of questions asked it is however not possible to analyse in a more detailed manner the specific shortcomings connected with the contents and structure of the information, nor to make any assumptions on how the product performs relatively to a similar product. Some of these questions were addressed in the telephone interviews described in the next section.

Telephone interviews with selected users

Based on their own willingness expressed by leaving their phone number at the end of the e-mail survey, twenty people were contacted by telephone to get a confirmation of their willingness to spend twenty minutes answering questions about the contents of the CD. The interviews were conducted three months after the e-mail survey and almost six months after most of them had received the CD. The interviewees were thus given a couple of days to review the CD if they wanted to. Three people answered the questions by e-mail, and six by telephone. They represent NGOs (3), governments (3), international organisations (1), and two consultants. Their positions rank from advisors to project managers to the executive director of an NGO. They were chosen explicitly to represent mainly the region covered by the CD-ROM, though still half are from Western Europe.

The first set of questions aimed at evaluating the contents of the CD. With the second set of questions we tried to get an insight on the respondent's habits in using electronic media to obtain information, and the third part addressed the technical features and the appearance of the CD-ROM.

In general, the answers did not follow a clear pattern, and it seems that we managed to serve different needs. Material that one person used less was another's favourite.

Questions evaluating the content of the CD

In your opinion, which is the most useful chapter of the CD?

The national reports and strategies were mentioned several times, but also the maps.

How relevant were the chapters for you: status reports, regional maps of threatened species, national reports, documents related to COP preparation meeting, links to publications, convention-related processes?

Generally, the practical (conference and contact) information is more popular than the substantive status reports. Opinions varied on the regional threatened species maps. The list of publications were perceived useful, but not comprehensive enough.

Was there anything that could have been left out?

Nobody wanted anything to be left out.

What additional information would you have liked/wished to see on this CD-ROM?

A more complete collection in all chapters, in particular of the national strategies and the publications. Additional text documents from outside the region. More maps and statistics, methodologies, additional contact information about NGOs, summary reports based on first national reports and several more that were mentioned only by one person so that they cannot be mentioned all here.

What do you see as the main flaws of this CD-ROM?

- There is some incorrect contact information.
- Technical problems (links not working), cannot be updated.

Can you make a project or a decision related to the environment based on the information in this CD?

There was no consensus on this question. The answers ranged from: it can add to the decision making process, it is enough for an expert already familiar with the subject, and to not being relevant as the person works policy-related.

In your opinion, can a decision-maker make decisions regarding the special protection of a certain area of his country or a campaign to save a certain species, based on information contained on this CD? At what level of decision-making can this information be useful?

- At national level, yes.
- Not directly, but overview over issues involved.
- International level and ministerial level.
- Mostly a reserved yes.

If not, what other additional information would be needed?

More specific information, more detailed statistics.

Was the quality of the language high enough?

Yes (for non-English speakers, Russian ok).

Is the quality of the data high enough? Is it high enough for decision-making at national, regional or local levels?

Yes, though additional info is needed to verify. Some data is old.

Would this CD be a useful tool to talk about biodiversity issues in secondary schools?

Consensus: Everybody thinks it is a useful educational tool for secondary schools. Some even thought it could be used at elementary school level already (parts of it, not the documents).

Could it be used as material at the university level? Why/why not?

Yes, as some details are available, lower university level though.

What would need to be changed?

No comments on changes that would be necessary to adapt to educational purposes.

Is it possible to compare information across the different country reports?

In general, yes. Based on the material people are able to get a general idea of where a particular country has its strengths and weaknesses. One person proposed to arrange the material not only by countries, but also by topics to allow better, direct comparison.

Questions related to habits in using electronic information

How often do you use a CD-ROM to search for information on an environmental matter?

Mostly the answer was not very often, approximately every two weeks to every three months.

Do you like using CD-ROMs?

Yes, if they are as user friendly as this one and you do not need to install a lot of things first. There was one exception where exactly this annoyance with automatic installations completely killed the pleasure of using CD-ROMs.

How often do you use the Internet for the same purpose? (Daily, weekly, monthly, less)

The use of the Internet ranges from the same as the CD-ROM to several times daily, but in the context of biodiversity the CD is used in equal amounts.

Are CD-ROMs a necessary and useful tool to disseminate environmental information? Why/Why not?

General consensus: Yes, particularly in the CEE, though not suited to reach more than just experts, as the general

public still has limited access to powerful computers. In many cases, access to the Internet is nonexistent or expensive.

What other means do you prefer?

Books, because they are easier to use on the road, magazines (updated information), Internet, and telephone.

Questions related to the technical aspects and the appearance of the CD

Do you have any comments about the visual presentation of the information (e.g. the ratio of maps, graphs versus tables and text) contained on the CD-ROM?

The CD is generally attractive. No suggestions for improvements were made except that some felt there should be country maps included for orientation purposes, particularly for people unfamiliar with the region.

Does the content of the CD live up to the expectations raised by the cover design?

Yes. (One person mentioned that the title is not correct since Central Asia is not mentioned. But, it actually is referred to as the 'NIS')

Did you find what you were looking for on the CD?

Here the answers varied:

- Yes, but more maps are needed,
- No, not all strategies are included,
- More than expected from cover.

Did you encounter any problems when navigating through the CD? (No return buttons, lost at the bottom of a page, etc.?) Technical problems?

Broken links to on-line internet sites. Broken links where instructions in e-mail (sticker) have to be followed. (*Seems that nothing in addition to what we were aware of ourselves has gone wrong*)

Any other comments? Do you have any comments about the structure of the CD? (Menu bar on top, other features)

- Well organised.
- Good to have everything in one place for a presentation, otherwise all this info and more is available elsewhere.
- Would be a good model for other regions. Especially in Latin America and the Caribbean, where there is little assembled information.
- Has seen positive reactions and would support a follow-up for the Tirana meeting in Feb 2001. Competition with others (EEA, WCMC, CHM) exists, cooperation necessary.
- Very popular at COP, many requests received by e-mail.

Evaluation of project and product against issues paper essential issues: ■

Process vs. product

Clear emphasis was in this case put on providing an information product in a 'quick and dirty' way with little regard to a process. The particular case has to be seen as a harvesting exercise from the overall ENRIN capacity building and networking process. Without the 5 year+ involvement in the region with training and regular contacts and visits, it would not have been possible to activate such a big number of focal points to deliver a report matching expectations fairly well with very little explanatory material.

Information base maintenance/creation

Close to no information base is directly available, because of the ad-hoc nature of the exercise. An information base was not created in an organised way because all substantive information was assembled in the individual country reports with the exception of the incomplete compilation of PDF and word documents of national strategies and action plans and first national reports to the biodiversity convention.

Quality control: The resources allocated for co-ordination, communication and quality control were too few. We have to either improve the efficiency of our quality assurance routines (how?) to improve the products with the equal amount of resources or accept the fact that we can only continue such production if we subsidise such projects with ENRIN or core funding.

Targeting of product towards a specific user group

From the beginning the task was already restricted to addressing a particular user group: the biodiversity Conference of Parties and COP regional preparatory meeting participants, with a secondary audience being interested individuals and specialised NGOs and international organisations. This was partly taken into account by adding conference-related documentation. The Eastern European focus was taken into account by providing a bilingual edition English/Russian. Individual country reports have no specific focus. There was no time for detailed instructions/training to subcontractors within the restricted timeframe.

See annex 1

Packaging

The packaging in the form of a CD-ROM allows the assembly of a wealth of information in different forms. It is attractive because of its size as well as the possibilities for visual presentation of information.

Dissemination: This particular product enjoyed a very broad dissemination thanks to the linkage to the COP. However, most of the people who received the CD did not ask for it, so we cannot judge from this how popular it was.

User response

Very detailed user response collected thanks to special impact assessment project.

Survey: From the types of questions asked it is not possible to analyse in a more detailed manner the specific short-comes connected with the contents and structure of the information, nor do they give any indication on how the product performs relatively to a similar product.

Capacity building

Very limited capacity building aspect in this particular project, but the project can be seen as a successful result of the ENRIN capacity building effort (see Process vs. product).

Can the experience of this survey provide counter arguments to the provocations of the issues paper? – an attempt

Source/Club unknown to the outside world...

The process helped to make ourselves and the focal points of the ENRIN programme known to a broad audience in a related, but up to now fairly unknown field – the biodiversity “community” - both during the production (the ENRIN focal points were obliged to interact with the biodiversity experts in their own country to get the necessary data) and with the product.
CLUB not necessarily unknown to rest of the world.

Focus on process rather than products...

Opposite in this case.

Recycling rather than creating original products...

No objection.

Gloss, gloss...

Contents to a large extent justify expectations raised by glossy cover.

Not targeting user groups...

Sorry, already learning and partly targeting.

Functional units or still born babies?...

22 country reports in 2 months from existing focal points.

Zero impact on the environment...

No way to judge.



Annex 3

Analysing the usage of the world-wide web

- a | Analysis of users who downloaded products from the GRID-Arendal maps and GIS on-line database
Lawrence Hislop

The task - purpose

Since March 2000, GRID-Arendal has implemented a new web page order form on our Maps and GIS database web site. The new form requires anyone who wants to download an original Map or GIS file from our database to fill out a simple order form with such information as the requestors Name, E-mail, Institution, A brief description of what they intend to use the data/map for, etc... The only required field in the form is the contact/e-mail address, and if this is not properly filled in the user will not receive the product they ask for.


The purpose of this exercise was to try and get a better understanding of who our users are and what they intend to use our products for without putting too much demand on them to spend time filling out a complex order form.

All of the filled in forms are accessible through a searchable database on the GRID-Arendal network (the file is stored at I:\201\007\Information Requests Database\requests.mdb). From the database we have also made some automated reporting mechanisms so that it is easy to make tabular reports based on queries by Country, Institution type, and keyword (two of these are displayed in the annex to this paper).

The results

One of the most interesting results from analysing the usage of the Maps and GIS web site since implementing the request form is that people do not seem to mind filling out the form in order to get access to a database product. Comparing the web site statistics from the time before and after the request form was implemented indicates that web site usage patterns remained essentially the same for the past three quarters. This is very positive and means that we can likely get access to user information without putting too much demand on our customers to provide us with their information. This is probably the case because the form is very simple and takes only 1-2 minutes to fill out.

Maps, Graphics, and GIS Dataset Order Form



GRID
Arendal
Service Box 706
N-4808 Arendal
Norway

Item number: 1177
Title: **Acid rain in Europe**

Please fill out the information below and then click the "Request file" button. Learning about the people who use our materials will help us improve the materials we provide.

The file you are requesting will be sent to you by email within two working days.

Your name:

Your email address:
(Type carefully! We can only reply to your request if the email address you give is correct and complete.)

Are you associated with:

The name of the organization you represent:

What country are you from?

Web page order form for data requests

Record an information request

Name <input type="text"/>	Record a new request
Institution <input type="text"/>	Browse request
Address <input type="text"/>	Delete this request
Country <input type="text" value="Please select one..."/>	Find a request
Email address <input type="text"/>	Save and exit
Requester is <input type="text" value="Please select one..."/>	View reports
Sent via <input type="text" value="Please select one..."/>	

Describe the request or question

Describe the answer given

Keyword (Select from the drop-down menus or just start typing in the field)

Material requested

Coverage

Date received The request was answered
 Date responded The request was referred elsewhere
 The request was not resolved

Handled by (your name or initials) Hours used

Amount invoiced (NOK): Project number charged:

Record: 1 of 85 of 85

Database for requests

Who is downloading?

One of the main conclusions of this exercise is that most of the institutions requesting items from the database are academic and/or from the private sector. These requestors seem mainly interested in using the products for classroom presentations or for use in published materials where a map of a country is required. Some requests did come from people just needing a map for their personal use such as Robert Soen from the Netherlands who explained “For my holiday in Croatia I like to have a good map to set my viewpoints in my computer”

Filled in form from the database

Name of Institution: Federal University of Ceara
Country: Brazil
Item number: 1461
Item title: Projection of global average temperature to 2100
Intended use: I intend to use not only this, but all your graphics and maps in an extended university course on Global Change. The plan is to use them for overhead projection.

Searching the database by ‘country’ indicates that most of the requests are coming from Norway, the USA, and Russia followed by a long list of other European countries. It is also interesting to note is that people are able to access our web site from all corners (China, South Africa, Chile, etc.) of the planet, find what they are looking for and download the product.

Filled in form from the database

Name of Institution: Daewoo Heavy Industries Ltd.
Country: Korea, Republic
Item number: 1269
Item title: Presentation map of Hungary
Intended use: I am just planning to use the information for marketing and sales for machine tools made by us for the area of Central Europe, including Hungary.

Filled in form from the database

Name of Institution: Lawrence Berkeley National Laboratory & IPCC
Country: USA
Item number: 1242
Item title: Atmospheric concentration of CO₂
Intended use: We are writing a report on the insurance industry and climate change, and your graphics will be very useful to us in the introductory section on the basics of climate change

By viewing the requests by their ‘Intended use’, it is possible to see that people are using the products for a whole

range of purposes, from analysis, research, and presentations to using a product for personal web pages or projects where a country political map is necessary.

We now have a database filled with institutional and personal e-mail addresses of users that may be added to a larger list of GRID-Arendal users. Having this list allows us to follow-up with people to find out if a new product was created because of the download, and to see generally how our information was used. It will also be easy to track the visitors that we know of to see if they return to the web site to find additional products another time.

The main issue relating to the requests database is to sort out what we will do with the information we are collecting, and how much resources (internal time) should be spent sifting through the requests to identify which ones to follow up.

What is downloaded?

From an analysis of the 'keywords' section of our manual requests database we are able to get an initial indication of what types of information our users are looking for. People who make manual requests are asked to select from a 'keyword' list, the type of information that they are looking for. This is one of the few areas where our users directly ask us for specific types of information they need. A quick overview of keyword list below reveals that most of our users are looking for maps and geo-referenced information, followed by information about Climate Change, Air Pollution, and Biodiversity. This may indicate to us that we should focus on making more of this type of information available to the public.

Next steps:

Things we can do to improve the system.

On the web site:

Make all fields in the form required.

Currently the web site form does not require people to fill out every field on the form – some of the fields are optional. It would be useful to keep the form in its current simple format but require that all the fields be filled out so that we ensure that users tell us whom they are affiliated with, and for what purpose they use the database item.

Simplify the form.

We could also simplify the form by incorporating more drop down selection boxes (instead of free text boxes) which will make it easier and faster for a user to fill out.

Implement new forms in other parts of the web site.

In order to expand this activity and try to find out more about people using particular parts of the web site, we should implement more feedback forms that allow people to respond to us about information on the pages they are looking at.

Make completed forms more accessible to GRID-Arendal staff.

The database holding all the completed feedback is now available as an Access database and can be complicated to view unless one is familiar with this software. GRID-Arendal should create a web site in which the staff can easily read the completed feedback forms.

On the database:

Separate analysis for general requests and on-line requests

Currently general information requests (phone, fax, e-mail) that come into GRID-Arendal are stored in the same database as the requests for Maps and GIS database items. It would be worth incorporating a filter to separate all the database request forms so that they can be analysed separately from the general requests.

DATA

Number of requests by Institution type

Institution Type	Percentage	Requests
Academic/Science	33%	56
Commercial	24%	40
NGO	13%	22
Government	9%	15
Schools	7%	11
Other (undefined category)	6%	10
UN agencies	4%	7
GRID-Arendal (internal)	2%	3
Media/Press	2%	3

Number of requests by Region

Region	Percentage
Western Europe	47%
Eastern Europe	22%
North America	17%
Asia	5%
Africa	3%
Other	6%

Number of requests by keyword Report Period: Jan. 99 - Mar. 01

Region	Percentage	Requests
Maps products	19%	51
GIS products	13%	36
Climatic issues	8%	22
Human settlements	6%	16
Air pollution	5%	5

Analyse by keywords

It would also be interesting to know more about environmental themes and geographic areas that people are interested in, and we could tie in the database keywords with the web site request forms.

Upgrade the automated statistics reporting.

The database reporting forms (shown below) were made in a very simple format and should be enhanced to include graphical elements (pie charts) as well as tabular data and expanded to include analysis by region and keyword.

On general tailoring for users:

We can use all of this information to evaluate our performance (performance vs. mission) and to re-design and focus our web site based on this user input.

Number of request by Country

Country	Percentage	Requests
Norway	21%	39
United States of America	15%	27
Russian Federation	8%	15
Germany	5%	9
United Kingdom	4%	8
Sweden	3%	6
Italy	3%	5
Switzerland	3%	5
Canada	2%	4
Poland	2%	4
Ukraine	2%	4
Belarus	2%	3
Japan	2%	3
Macedonia, FYR	2%	3
Romania	2%	3
(unknown)	1%	2
Australia	1%	2
Austria	1%	2
Bosnia and Herzegovina	1%	2
Brazil	1%	2
China	1%	2
Denmark	1%	2
France	1%	2
Georgia	1%	2
Ireland	1%	2
South Africa	1%	2
Spain	1%	2
The Netherlands	1%	2
Argentina	1%	1
Bulgaria	1%	1
Chile	1%	1
Czech Republic	1%	1
Finland	1%	1
Greece	1%	1
India	1%	1
Israel	1%	1
Kenya	1%	1
Korea, DPR	1%	1
Korea, Republic	1%	1



Annex 3

Analysing the usage of the world-wide web

b | What are people searching for?

Brian Lucas

The GRID-Arendal home page includes a search tool that allows people to type in any word or phrase and search for it throughout our web site. These searches represent people arriving at our home page seeking information which is not immediately visible as a link on the home page, or which is rather specific. By analysing what people are searching for, we may be able to (a) improve our home page design and better direct people to information that we have, and (b) identify areas where we might consider developing new content.

We examined the words that people typed in as search terms from June through October 2000. We examined only peoples' initial searches (i.e. searches conducted from the home page), not refinements to their searches (searches conducted from the search results page). We excluded searches made by people inside GRID-Arendal.

As expected, we found a wide variety of search words and phrases. Even after aggregating query phrases, no single query was responsible for more than 3.4% of the total queries. Queries ranged from the general ("environment") to the very specific ("which countries are responsible for Norway's acid rain problem"). Other queries were topical — in particular, searches for "russian nuclear submarine" and similar terms, no doubt in reaction to the tragedy of the *Kursk*.

The following are the searches that occurred **more than 1%** of the time:

3.4%	France
2.7%	Acid rain
2.2%	Nuclear (including nuclear accident, waste, pollution, and submarines)
1.8%	Aral Sea
1.3%	Ozone
1.1%	Heavy metals

It is rather surprising that "France" should be the most frequently used search term. We speculate that this may be related to publicity through our connection to *Le Monde diplomatique*. Our web site highlights our own geographic areas of specialty (Nordic/Baltic, Arctic, and Central and Eastern Europe), so anyone interested in other areas must use the search tool if they wish to investigate further.

The presence of major environmental issues such as acid rain, ozone, and heavy metals is of course to be expected. One might also expect climate change to rank highly, and it does (at 0.9% of requests). Since a link already represents it on the home page, it is not as frequently requested as a search.

Possibilities that suggest themselves from this analysis:

- There may be opportunities to better serve visitors interested in areas outside our geographic specialty, perhaps by directing them to other sources of information. In particular, we could investigate French sources.
- There can be a significant demand for information about issues that are highly topical. We should consider developing the ability to prepare small briefing packages on short notice in reaction to major world news stories.
- We could consider developing new content, or linking to existing information, about issues such as acid rain, nuclear issues, ozone, and heavy metals.



Annex 4

Coercive communication: dangers and alternatives

Nickolai Denisov

Among the most successful calls for action are those transmitted using sophisticated propagandistic techniques that are based on a focussed, biased, and carefully served interpretation of selective facts. Accounts of success of political, commercial (advertisement) and corporate (public relations) propaganda are numerous.

Such propaganda is however destructive by nature as it essentially eradicates the ability of its subjects to think and act independently. ‘...if democracy is a way of life, composed of tolerance, respect, degree, choice, diversity, and so on, all propaganda that acts on behavior and feeling and transforms them in depth turns man into someone who can no longer support democracy because he no longer follows democratic behavior... The question is not to reject propaganda in the name of freedom of public opinion – which, as we well know, is never virginal – or in the name of freedom of individual opinion, which is formed of everything and nothing – but to reject it in the name of a very profound reality: the *possibility* of choice and differentiation, which is the fundamental characteristic of the individual in the democratic society’ (Ellul 1973).

Interestingly, propaganda for a ‘good’ cause destroys its subjects in precisely the same way and there is nothing that would make the propaganda of ‘green values’ any different in that respect. ‘What gives propaganda its destructive character is not the singleness of some propagated doctrine; it is the instrument of propaganda itself. Although it acts differently, according to whether it promulgates a closed system or a diversity of opinions, it has profound and destructive effects’ (Ellul 1973). Other researchers of coercive techniques believe however that ‘using what influence we have is not in itself a destructive thing. The problem arises when the style and force of a person’s or institution’s influence outweighs the merits of whatever it is they’re trying to get us to do’ (Rushkoff 1999). But who can judge at what stage the merits are outweighed?

On the contrary, ‘objectively communicated’ information should in theory act in the opposite way, forcing people to

Pragmatic.

Recognising that if I don’t do this thing which is nasty (but profitable) somebody else will; or that if I do something decent (but costly) its effect will be insignificant... (See *Idealistic*)

Idealistic.

With scruple. (See *Pragmatic*.)

Herman 1992

think and choose on their own. Only such information is also the least efficient since its interpretation requires a lot of time and energy. Since nobody has any more time to think and choose, a competing flow of direct propaganda easily captures the majority. ‘Of course, an outstanding man of vast culture, great intelligence, and exceptional energy can find answers for himself, reconcile himself to the absurd, and plan his own action. But we are not thinking here of an outstanding man (who naturally we all imagine ourselves to be) but of the ordinary man’ (Ellul 1973).

If one seriously wants information to make an impact on people’s behaviour here and now, the most suitable techniques are those of propaganda since they are in principle capable of reaching concrete short-term goals, also decent ones like protecting the environment or people’s health. However, in the long-term such techniques represent a very real and serious threat to democratic culture, although their use could probably be totally avoided only if exterminated everywhere at once, as well as if one could at once dramatically elevate people’s culture. ‘It would not be necessary if the citizens were to work only three or four hours a day and devote four hours daily to personal reflection and cultural pursuits, if all citizens had a similar cultural level, if the society were in the state of equilibrium and not under the shadow of tomorrow’s menace, and if the moral education of the citizens enabled them to master their passions and their egoism.’ (Ellul 1973).

In our real world, are there ways to achieve the same results with no devastating social effects? Regretfully we do not know any that would be nearly as effective at least in the short time. There are however alternative approaches to mass communication that either strive to achieve effects in a similar direction by non-coercive means or to counter-balance manipulative techniques.

1. Raising true general culture and education of people to increase ability to think independently. (However if culture and education are just above the average, they on the contrary make an ‘informed’ person more vulnerable to

manipulation (Ellul 1973). Therefore, an effort is needed to raise individual culture above that critical level.)

2. Evoking peoples' own reactions rather than stereotypic collective responses. An example of the latter in monumental art is the *initial* (with no figures or flagpoles) design of the Vietnam Veterans Memorial in Washington DC, USA: 'Maya Lin, then a 21-year old student... said that she intended the memorial "to bring out in people the realisation of loss... Brought to a sharper awareness of such loss, it is up to each individual to come to terms with such loss. For death is in the end a personal and private matter and the area contained within this memorial is a quite place meant for personal reflection and private reckoning".' (Clark 1997).

A related approach is the 'demythologisation' of communication medium by creating an interactive environment and a dialogue with the audience: propaganda 'by its very nature... excludes contradiction and discussion' (Ellul 1973). When the back-yard of an information workshop is deliberately exposed as nothing mystic but purely technical, the audience is dragged in the process of creating messages through resolving open-ended situations, again with no ready-made answers. Plays by Bertolt Brecht in the 1930s and films by Jean-Luc Godard in the 1960s are examples of such an approach; none of them however has been popular except among intellectuals (Clark 1997).

In a similar way, modern information technology was once believed to have become a tool that is automatically able to counteract such one-way electronic media as radio and television traditionally used for persuasive communication. 'Through the eighties and early nineties, I cheered as cable television, video games, the personal computer, and the Internet seemed to offer the promise of a new relationship to the mainstream media and a chance to undermine its coercive nature. Home-video cameras demystified for us the process by which news is reported, and public-access channels gave everyone an opportunity to broadcast his version of what was going on... Huge, well-funded, mainstream publicity campaigns were becoming obsolete... The only alternative left for public-relations people and advertisers was to tell the truth. Those promoting good ideas or making useful products would succeed; the rest would perish...' However, these expectations might have been

too optimistic: 'the rapid change we have experienced in the past several decades... has provided ample opportunities for our coercers to retool and rearm themselves. Even when a new technology, like the Internet, appears to offer us a chance to reclaim our mediaspace in the name of community or civic responsibility, it fast becomes a new resource for the direct marketer, the demographics researcher, and the traditional advertiser...' Nowadays 'the Web is – for the most part – a read-only medium. It is flat and opaque... You don't socialise with anyone when you visit a web site... But only by compromising its communicative function could the Web's developers turn the Internet into a shopping mall' (Rushkoff 1999). 'Media companies have not really made an effort of innovation or originality, and have only adapted the Internet to the one-linear model of traditional press or television, instead of using the new media to experiment' (Centre d'Estudis... 1998).

3. 'Anti-propaganda' (not 'counter-propaganda', which is simply a propaganda of opposing values) unveiling of the meaningless of propagandistic clichés as such.

'Media-literacy resources are popping up on the Internet and as part of public-school curriculums, designed to educate children about the manipulative power of advertisements and commercial programming' (Rushkoff 1999).

In the field of art, 'the text-based work of the American artist Jenny Holzer... encourages a suspicion of verbal messages, and especially of didactic or opinionated statements. On posters, bronze plaques, engraved granite slabs, and electronic sign-boards, Holzer writes messages which are not in "her" voice, but in styles that mimic the anonymous voices of authority: government, education, advertising, and other, sometimes undefinable, sources of public advice or private confession... By placing them in urban settings, alongside real advertisements, street signs, and traffic signals, she reflects the experience of city life in which the proliferation of competing messages has created a bewildering forest of authoritarian signs... Describing Holzer's work, the critic Hal Foster... wrote: "Coercive languages are usually hidden, at work everywhere and nowhere. When they are exposed they look ridiculous".' (Clark 1997).

Full references: see page 27

On the cover: Tatlin's tower

Vladimir Tatlin (1885-1953) had been the head of the Moscow branch of IZO Narkompros (The Commissariat of Enlightenment's Department of Fine Arts) shortly before conceiving his plans for his famous Model of the Monument to the Third International completed in 1920... Tatlin's tower was a model for what would be the tallest building in the world. Suspended inside its skeletal framework, a series of glass buildings was planned to accommodate the government of the future. Like parts in a machine, the buildings would slowly revolve, keeping pace with the movement of the planets. Study of Tatlin's design has revealed layers of esoteric symbolism incorporating astrological and alchemical codes.

But the tower was also to act as a centre for mass communication. It would be crowned by a radio station and the whole structure would serve as a transmitter of propaganda. Information from around the world would be collected by radio receivers and a telephone and telegraph exchange. The agitation centre would broadcast appeals and proclamations to the city. In the evenings the monument would become a giant outdoor cinema, showing newsreels on a screen hung from the building's wings and, in response to current events, appropriate slogans would be written across the skies from a projector station in letters of light.'

Toby Clark.
'Art and Propaganda in the Twentieth Century. The Political Image in the Age of Mass Culture.'
Harry N. Abrams, Inc.,
New York, 1997

Computer model by
Frank Howarth,
Harvard University

