Informed decision-making in biodiversity

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This is the text of a short paper presented at the "Conference on Sustainable Use of Aquatic Biodiversity: Data, Tools and Cooperation" held in September 1998 at Expo 98, Lisbon, Portugal.

1. Introduction

Concerned individuals and communities have been very successful in encouraging the international adoption of broad commitments to the concepts and principles of sustainable development and maintenance of biodiversity. Major breakthroughs are represented in the international adoption of Agenda 21 and the various Conventions on Biodiversity.

Where they have been less successful, however, is in effectively and convincingly influencing a variety of constituencies to change current practices, and in influencing key policy and planning decision-makers to adequately resource the pursuit of such changes. It is early days yet, but there is evidence of major mismatch between intent and delivery.

Somewhere along the line the research community, or at least someone from the research community, needs to engage more positively with those parties most directly associated with practices that undermine maintenance of biodiversity – with policy makers and administrators, commercial interests and consumers. Such engagement will inevitably involve, in part, discussion of the financial implications of any changes being proposed – and this is where the problems lie. The research community is poorly equipped to identify such financial implications, and is not pre-disposed to seeing complex science translated into crude measures of value and worth.

Whilst understandable, perpetuation of such a situation is counter-productive to the interests of scientific research, biodiversity maintenance and sustainable development. The case for addressing this dilemma is outlined below, with some suggestions as to how to unravel this tricky knot. A number of short examples drawn from projects completed by Nautilus serve to demonstrate where intent and delivery are at odds. These are annexed to this paper.

2. Lever points for change

In simple terms there are four main constituencies impacting on biodiversity, and four key lever points where pressure can be brought to bear to change people's actions:

- the research community
- public administration
- commercial / economic interests
- consumers

In terms of the driving forces behind each group:

- the research community seeks, in general, an intellectual reward, and much of its decision-making is made on this basis; it is also responsive, however, to concepts of public good, and to the influences of commercial interest;
- public administrations are responsible for creating and regulating the policy and planning environments within which social, economic and commercial activity takes place; they are influenced by short-term political considerations, and are subject to pressure from commercial, community and special issue groups;
- commercial and economic interests seek a return on investments, to a level commensurate with the risks undertaken;

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- consumers are driven by considerations of basic needs and quality of life, but also by matters of fashion; they can be fickle and un-predictable.

In respect of biodiversity management, whilst the policy and planning environments provide a framework for public activity, it is primarily the commercial interests that impact on biodiversity, and whose actions are most damaging to the maintenance of biodiversity. Commercial activity is strongly influenced by the regulatory environment, but even more so by consumer behaviour, on which they are generally dependent for their revenues.

As effective lever points, it is essential that anyone trying to encourage actions that work towards maintaining biodiversity, and work in support of sustainable development, engage directly with commercial interests. Ultimately this has to be the main target for change. Secondary targets are the consumer and the policy and regulatory authorities. So far the reverse has been the case.

To date, the policy and regulatory authorities have formed the primary target of those seeking change. The impact of such activity can be seen in the broad acceptance of the concepts of biodiversity and sustainable development, but change on the ground has been less evident. The consumer has also been wooed, but mainly on emotional rather than rational grounds. This has and will continue to impact on consumer attitudes and preferences for a while, but consumers will increasingly seek more rigorously derived and factually based information on why they should buy product from one process chain rather than from another.

At the corporate level, direct efforts to change the behaviour and actions of commercial interests have been limited and of negligible impact. Greatest impact has been achieved through alterations to the regulatory environment in which enterprises operate. Little effort has, however, been made to address the economic and profitability elements of such changes.

3. Good science

To effect change with respect to the maintenance of biodiversity and sustainable development, it is the commercial interests that need to be won over, and this will only be achieved if it can be shown that change is in their commercial interests; that change impacts positively on the bottom line - profit. Failure to address the matter of profit is the quickest way to losing the argument.

Profit can be addressed in a number of different ways:

- in a dynamic market place, with increasing public consciousness of the extent of the continuing inefficient use of natural resources, such changing consumer attitudes can greatly reward those companies that respond to new market needs;
- improved resource use can provide many cost savings in production processes;
- a tightening policy environment will generally penalise those companies that employ poor practice;
- increasing the scale of penalties imposed on those companies producing unnecessary waste and pollution impacts strongly on profit, and also acts as an encouragement to the employment of more efficient or more benign production technologies;
- restrictions on resource access will encourage the use of less wasteful production technologies, and reward the more efficient operators;
- the changing topography of the market place as more realistic valuations of resources and resource use kick in offers enormous new opportunities for making profits;
- incorporation of one or more of the emerging forms of environmental accounting systems into published accounts, or even into statutory accounting practices, would fundamentally affect the way that commercial interests exploit natural resources.

In each of the above cases there is a requirement that the impact of man's actions as well as the costs and benefits of alternate action is identified, quantified and valued. The research to inform such work needs to be rigorous, comprehensive, and expressed in ways that are comprehensible to non-scientists. The messages to decision-makers arising from such work need to be, wherever possible, simple and un-ambiguous.

Unfortunately, the research community itself is often guilty of trying to buck the market – seeking to ignore market forces and to base requests for research funding on the argument that because the frontiers of knowledge exist we need to explore beyond them, no matter what the cost. It is unrealistic

to base all research arguments on this premise; the vast majority of requests for research funding need to demonstrate quantifiable outputs and benefits.

Increasingly, such funding requests need to fall within a multi-disciplinary framework of research, within an integrated programme. This is only logical in that the results of such research are expected to inform decision-makers; decision-makers that are expected to take a wide range of factors into account. But again, all too often, research proposals are stand-alone in nature. They lack rigour in design and execution, and resistance to the idea of integrating such research with other disciplines and lines of research is such that research outputs often fall far short of expectations, are often unnecessarily ambiguous, and represent poor value for money. Bad planning is as debilitating an aspect of research as under-funding.

Both can be addressed by:

- making greater use of monitoring and evaluation techniques already widely used in project and programme planning and execution;
- applying a programme and inter-disciplinary approach to research planning;
- overt recognition of the market dimensions of research funding and the application of the outputs of research programmes;
- involving economic and social partners more directly in such research, and in the disemination of research findings;
- making more overt use of valuation techniques to both justify research funding, and demonstrate the impact of research outputs.

4. Examples

A number of short examples drawn from projects completed by Nautilus serve to demonstrate where intent and delivery are at odds.

4.1 Danube Delta Biosphere Reserve[1]

Much of the Danube Delta, where the River Danube enters the Black Sea, has been designated a site of international importance in respect of its inherent biodiversity, and its transient bird populations. There is some human settlement within the deltaic area, but the main population is located at the periphery of the delta area. This population traditionally harvests the reed and fish resources of the delta. In 1993 the Danube Delta Biosphere Reserve was established, with funding from the Romanian government and the international community. As part of its administration duties, the Reserve Authority is seeking to control resource exploitation in the Reserve and, in some instances, to re-instate the natural ecology of areas that have been poldered.

There continues to be much resistance to such activity from the principal commercial organisations that exploit the resources of the Reserve, and from the political interests that were formerly responsible for the administration of all of the delta area. After some years of friction between the various parties, during which the Reserve Authority has achieved positive implementation of some exploitation controls and reinstatement of some natural habitats, it is now seeking to win over the commercial and political players through the use of both traditional and environmental economics. In recognition of the fact that “money talks”, the Authority is to provide information on the commercial and economic impacts of its strategy for the management of the reserve. This will be expressed in terms accessible to commercial operators and politicians, and through it the Authority hopes to effectively demonstrate the worth of its policies. It will also, incidentally, use such valuations to justify continued funding of its activities from national and international funding holders.

4.2 Mangrove forests[2]

An evaluation of the sustainable use of mangrove forest in North East Sumatra showed that the high population density adjacent to the coastal mangrove forests largely precluded the sustainable harvesting of mangrove resources for local use – for firewood, charcoal production, coppicing and joinery. Considerable, but variable, value was placed on the inherent ecology of the mangrove swamps - notably as protected areas for spawning and juvenile development of a range of

commercially exploited fish and shellfish - and such valuation was used as an argument in favour of the rigorous conservation of mangrove resources.

In providing the best sustainable returns to labour and to capital, however, capital intensive shrimp farming was found to the be most productive, but only if each farm were separated from the next by a pollution sink zone of several kilometres. Less intensive cultivation technologies were found to provide poorer returns to labour, capital and resource use, and to be ultimately unsustainable in areas of even moderate population densities. But, the successful application of more intensive cultivation systems was totally dependent on the presence and enforcement of a strong spatial and commercial planning regime. In practice, as has been shown all too clearly in the development of intensive shrimp farming in most parts of Asia, the planning regime has rarely been robust enough to prevent commercial interest from indiscriminate over-development. This has been at enormous cost to the environment, to the coastal economy, and to coastal communities, and flies in the face of the concepts of sustainable development and maintenance of biodiversity. In these cases, the local administrations, in most cases due to insufficient political support, find themselves complicitous in providing local power elites with a short-term bonanza at enormous cost to the local ecology, both natural and human. It is all too easy to recognise in these circumstances that ”money talks”.

4.3 Sturgeon[3]

Exploitation of the sturgeon resources of the lower Danube river system is arguably far less intense than in many, if not most, other areas of the world where sturgeon is found. Yet the stocks of the six species endemic to this river are considered to be at an all time low, with some under threat of local extinction. The three main causes of such a circumstance must be attributed to all or some of chronic pollution, habitat modification, and over-fishing. Stabilising this situation will be difficult, and there will be on-going requirements for well planned research into the causes of population decrease, and into how they can be reversed. But as long as caviar commands premium prices on the world’s markets, poor fishermen will continue to target this fish.

We already have the technology to identify what species and stock of sturgeon a particular jar or tin of caviar comes from, and to trace each jar or tin of caviar from source to consumer. With the exception of Iran where a state monopoly provides considerable order to the process, over half of the caviar harvested is of such low quality that it is rejected by importers. Indeed, the demise of communism has brought about a state of anarchy in the sturgeon fisheries of the Volga, the largest sturgeon fishery in the world, such that uncontrolled harvests have resulted in a flooding of the world caviar markets. Consequentially, prices have dropped, caviar has become accessible to even more consumers, and the demand for caviar has never been higher. Under these circumstances, conservation is practically impossible.

Whilst further biological examination of the cause of stock degradation is important, the results of such work will not easily alter the conclusion that consumer demand for the product will continue to dictate the legal and illegal activities of fishermen.

However, persuade producers and traders that they could make much more money through a controlled trade, and educate the consumer in the ins and outs of sturgeon scarcity, and the many alternate sources of fish eggs, and caviar substitutes, and it should be possible to align consumer preferences and conservation policy. “Money talks”.

4.4 Black coral[4]

Black coral is a slow growing woody coral found in tropical waters. It is typically harvested for conversion to souvenir jewellery. Black whip coral is generally used to fashion a range of cabachons and beads used in broach and necklace production, whilst black fan corals are used to fashion small sculptures and figurines. On the whole such production enters into a low value souvenir industry, where the scarcity and slow growing nature of the animal is not mentioned. Such articles are held in low esteem by the purchaser, and commonly end up discarded or broken in no time at all.

Work in the Pacific has shown that it is possible to successfully “replant” black coral, and that a sustainable natural black coral stock can be maintained through a system of moderate cropping and “replanting”. In the Philippines the “clear felling” of black whip coral has led to local extinction in many parts of the country. The product of such harvests has been typically supplied to cottage factories in Taiwan, where they have been converted to cheap beads for export.

An alternate strategy was presented to the government of Fiji, where a conservation policy would be introduced such that only products from the sustainable harvesting of black coral would be made available for sale. Each article would be heavily worked by local artisan craftsmen, producing a unique souvenir product of high added value, with limited raw material requirements. Each article would be labelled as a product of a sustainable harvesting regime, and sold at a high unit price. To date, such a strategy has been rejected by the trade, on the basis that souvenir shops can make more money selling many cheap necklaces than by selling the occasional piece of worked jewellery. By contrast, at least one jeweller in Port Moresby, Papua New Guinea, has been in the habit of using local craftsmen to combine imported silver fittings and small quantities of black coral to provide unique and highly attractive items of jewellery such as necklaces, bracelets, broaches, ear-rings, ear studs, and cuff links. The consumer gets a prized item of jewellery, the jeweller and the local economy benefits, and exploitation of this scarce resource remains sustainable.

4.5 Coastal poor[5]

In many parts of the world, engaging in exploitation patterns that maintain biodiversity or support sustainable harvesting is not an option. Without land-holdings that could provide at least a subsistence living, many landless poor find themselves crushed into the coastal strip. This is the case in many communities in Sri Lank and the Philippines, for example. Under such circumstances, families are left very little option but to exploit the coastal marine resources. The political and economic systems in place – systems that differ little around the world, both in developed and developing countries - are such that there is little opportunity to plan in the medium to long terms. The imperative is to sustain the family through another day. With little to no access to other parts of the economy, it is little wonder that in Sri Lanka the coastal fishery resources are heavily over-exploited, or that in the Philippines the emergence of the shell trade in the seventies has since seen the decimation of large areas of coral reef, which in turn has under-mined the capacity of these reef systems to provide food for these same coastal populations.

In these cases the perpetrators of habitat destruction are not free to take ethical or moral stances in matters of resource exploitation. They are purely seeking to survive in a system that marginalises them, and a system that they cannot change. Social and economic exclusion remains a potent element in the imbalances found in the world's economies, and remains a major factor in the failure to maintain biodiversity and achieve sustainable development. There are also many instances where recently introduced un-sustainable practices have replaced exemplary systems of resource use within these same communities.

5. Conclusions

5.1 Communication

In conclusion, informed decision-making in biodiversity is not simply a matter of good science. It is the ability to communicate the results of such work in clear, unambiguous, and comprehensible language to those whose actions impinge on biodiversity – policy makers, commercial interests and consumers.

5.2 Valuation

At the base of such communication is the need to translate the results of the science into money terms – costs and benefits, increased or reduced profitability. It is in the interest of the research community to actively encourage and participate in the valuation of its findings.

5.3 Environmental economics

Of even greater significance in the longer term is the need to encourage the application of environmental accounting and valuation methodologies to resource use issues. In recognition of the fact that such methodologies are even now only emerging, and will need many years of further refinement before they are fully effective, the research community should actively press for the exposure of such methodologies to real life situations as part of the refining process.

5.4 Use of a safety net

Even the best designed and executed of research programmes and projects do not always, or indeed often, provide unambiguous guidance to decision-makers. But there remain all too many occasions where research planning and execution are not of the highest quality, and the inadequacy of the results proves a frustration to decision-makers, and reduces the value of the currency of the research community.

One of the simplest ways of avoiding such circumstances is to rigorously apply available logical framework planning, project monitoring and project evaluation methodologies. Such methodologies:

- expose research planning to great scrutiny (enabling the identification and correcting of weaknesses where they exist),
- actively test the logic of the research methodology,
- actively explore linkage to other areas of research and the work of other disciplines, and
- examine project logic in terms of planned outputs and impacts, value for money, and the risks attaching to non-achievement of outputs and impacts.

Application of such methodologies provides a safety net to the research community, reducing the incidence of under-performance, strengthening the case for adequate funding of research, and enhancing the likelihood that clear information can be communicated to key decision-makers.

5.5 Recognise that biodiversity maintenance is to do with people

Finally, so much that is said about biodiversity is done so in a such a way as to, at worst, ignore man's existence but, just as damning, to ignore the fact that there are economic and social dimensions to man's activities.

Few are in any doubt that man is the principal culprit in the reduction of biodiversity, but it is impractical and unrealistic to call for man to stop any particular action over-night. Successfully altering of human behaviour has a strong strategic dimension, and needs to be carefully thought out.

In developing such strategies the following factors need to be recognised:

- that clear and simple messages need to be presented to decision-makers;
- that there is need to present evidence of the value to public action;
- that there is need to present evidence of the cost-effectiveness of action;
- that there is a need to incorporate an inter-disciplinary approach to change in any strategy;
- that there is a need to involve input, and ownership, of relevant stakeholders in the development of any strategy;
- that the power of market mechanisms impacts strongly on us all, and that it can be as easily used in support of public good as against public interest;
- that for the public to make a choice between products or actions that support biodiversity or that reduce biodiversity, the public must have access to clear guidance (e.g. through accreditation schemes).

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[1] *From the "Danube Delta Biosphere Reserve Project" jointly funded by the Romanian Government and the Global Environmental Facility (GEF) of the World Bank – 1994 to 1999.*

[2] *From the "North East Sumatra Prawn Project" funded by the UK Department for International Development (DFID) – 1990 to 1997.*

[3] *From the "Sturgeon Conservation Project", a component of the Danube Delta Biosphere Reserve Project referred to in footnote [2] above – 1997 to 1999; and from the "Fishery Sector Study – Islamic Republic of Iran" funded by the Caisse Central de Cooperation, France and the World Bank – 1996/97.*

[4] *from the "Study of the markets for precious and semi-precious coral" undertaken on behalf of the South Pacific Forum Fisheries Agency and funded by the Commonwealth Secretariat – 1986.*

[5] *from the "Fisheries Sector Study – Sri Lanka" undertaken by the Investment Center, FAO and funded by the Asian Development Bank – 1988/89; and the series of studies "The markets for the miscellaneous marine products of the South Pacific" undertaken on behalf of the South Pacific Forum Fisheries Agency and funded by the Commonwealth Secretariat – 1982 to 1985.*