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Use of bird indicators in informing policy and practice: a tool for assessment

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Abstract – Biodiversity indicators are considered to be one of the most successful ways of communicating biodiversity status to decision-makers, helping them to prioritize their policy and practices on biodiversity conservation. However, it is less clear how decision-makers make use of indicators, not only in the field of conservation, but also in other fields of decision-making concerning social and economic development. Up to now there has been little assessment of the use of available biodiversity indicators by decision-makers. One of the reasons behind this is a lack of tools for such assessment. It is commonly asserted that birds are one of the most suitable groups for developing indicators for the state of biodiversity. Within Europe, long-term trend data exist that have enabled a suite of bird indicators to be developed. That is why the current study considers the processes standing behind the use of the Wild Bird Index as one of the most robust and well-developed indicators in Europe. This paper describes the role and purposes of biodiversity indicators in informing decision-makers and the debates in the literature on approaches to communicating an indicator's message effectively. As a result, the study proposes a tool for assessing the level of indicator uptake. The tool is designed for assessing the uptake of biodiversity indicators in general. After being tested, the tool is expected to contribute to assessments of other biodiversity indicators effectiveness.

INTRODUCTION

The international goal to 'reduce the rate of loss of biological diversity by 2010' increased the priority given to biodiversity assessments and the anthropogenic pressures on it. Indicators are one of the few ways to assess biodiversity, because it is too complex to be fully quantified at scales that would be policy relevant (EASAC 2005). This is why a number of initiatives (e.g. Streamlining European 2010 Biodiversity Indicators (SEBI 2010), the 2010 Biodiversity Indicators Partnership (2010BIP), etc.) are preparing indicators to assess the state of biodiversity at different scales: international, regional, national and local. One of the indicators included in these sets is the Wild Bird Index (WBI). It has a long history and is considered one of the most scientifically robust indicators to assess biodiversity loss, mainly because of its long-term data sets.

Besides being scientifically robust, the purpose of indicators is to inform decision-makers in their policy and practice (Smeets and Weterings 1999). Despite the relatively long history of the WBI, it is still not known to what extent it fulfills its role in informing decision-makers in Europe in their policy and practices. Thus the overall use of indicators on a national and international scale is still not known. One of the reasons for this uncertainty is the lack of tools for assessing indicators' use and thus to suggest their effectiveness in informing policies.

This study presents a tool that aims to assess the level of biodiversity indicators uptake by decision-makers. By assessing this level of uptake, the tool aims to suggest the effectiveness of biodiversity indicators in informing policy and practice on a national and European scale. The uptake of an indicator is the process of its acceptance and use.

The tool development will consider the uptake of the Wild Bird Index as a process but will not do the actual assessment of the indicator's effectiveness. The particular index is selected because of its longstanding history in preparation and use. The assessment of the indicator use itself is beyond the scope of this paper. After testing the proposed tool, it is intended to serve in future assessments of biodiversity indicators worldwide.

BIODIVERSITY INDICATORS - A REVIEW

The preparation of the tool involved literature review on the role and purposes of biodiversity indicators. In addition, several consultations were conducted during the study with established scientists and practitioners on indicators preparation and use. As a result, a tool for assessing the effectiveness of long existing biodiversity indicators is prepared.

Role and purposes of indicators

According to Smeets and Weterings (1999) indicators should have the following roles:

i) supply information on environmental problems, in order to enable policy-makers to "value their seriousness";
ii) support policy development and priority setting, by identifying key factors that cause pressure on the environment;
iii) monitor the effects of policy responses. In addition, the authors suggest that environmental indicators can be used as a powerful tool to raise public awareness on environmental issues.

Theoretically, the role of biodiversity indicators can be divided into two: (1) represent biodiversity, and (2) inform policy and practices. Indicators should reflect the characteristics of the object they represent and thus describe its status, track and predict changes, identify stressors or stressed systems, assess risks and influence management actions (Kurtz *et al.* 2001). As a result, indicators will serve to: 'track performance (results-based management), discriminate among competing hypotheses (scientific exploration) and discriminate among alternative policies (decision analysis)' (Failing and Gregory 2003).

The concepts above on roles and purposes of indicators can be visualized as in Fig. 1. The process of indicator use contains the following four stages: first - indicator preparation, second indicator use in a decision-making process, third - outcomes from the previous level, fourth - raised awareness (see Fig. 1). Starting off from the first stage when prepared, an indicator should incorporate its roles to present information on status, trends and outlook of biodiversity conservation. This information is driven by existing environmental problems and the public opinion on these matters. By incorporating information on status, trends and outlook on environmental problems, indicators aim to fulfill their role in informing policy and practice. On

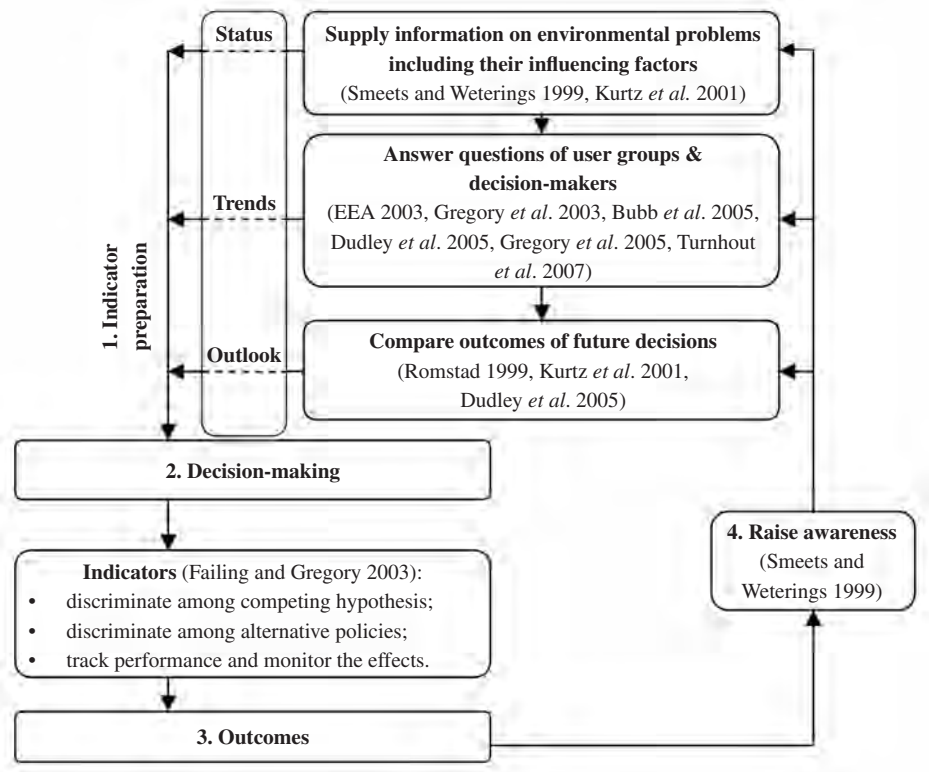

Figure 1. The process of indicator use.

the basis of this information, they are used at the following second stage: the decision-making process itself. At this stage decision-makers can discriminate among alternative policies and envisage desired outcomes. The third stage includes communication of specific outcomes from a decision-making process. These outcomes lead us to the following stage 4 and affect the environmental awareness of decision-makers and the general public (Smeets and Weterings 1999). The raised awareness in turn is expected to affect the following decisions on possible targets for an indicator. In addition the raised awareness will set additional questions for an indicator to answer. Thus the loop on indicators' use is closed.

There is disagreement in the literature on the role of indicators in reflecting policy priorities. Dudley *et al.* (2005) for example suggest that for an indicator to be of political value, it may need to embody a vision for potential solutions to a problem and "tell a wider story" about biodiversity. Thus it should play a larger role in setting and driving responses to pressures that it illuminates, especially in politically driven processes. This suggests that one of the main expectations of indicators' users is to receive information that will facilitate their future work. In support, a number of studies have defined an effective bio-indicator as one that can answer questions of potential user groups (EEA 2003, Gregory *et al.* 2003, Bubb *et al.* 2005, Gregory *et al.* 2005). More specifically, the same authors think that bio-indicators should be quantitative, normative (able to compare with baseline conditions), simplifying, user driven, allow aggregation at national and multinational scales, policy relevant, scientifically credible, consistent and responsive to changes over time, easily understood, realistic to collect and reliable. In addition, Dudley *et al.* (2005) and Turnhout *et al.* (2007) suggest that indicators should also have characteristics that go beyond pure science and concern social priorities and policy frameworks.

On the other side of the debate, Romstad (1999) suggests that policy relevance should not be considered as a criterion for indicator quality. The author gives two reasons for his theory: first, indicators relevant to specific policies may conflict with the precautionary principle policies of a subsequent decision-making body (e.g. next government). According to the author, if indicators are relevant only to the current government, then the next one may not have interest in using the same indicators. The second reason is that 'policy relevance may come at the cost of quality performance of indicators'. The same study suggests that indicators should be consistent and capture changes in key variables over time, be reliable and based on long time series of data, and be able to predict and identify risk; these qualities will make an indicator analytically sound. However, it is important to note that indicators' messages are analysed in specific decision-making frameworks. Thus if these messages are not relevant to decision-makers, governors will not use an indicator - regardless of its high quality. This is why incorporating the users' needs makes an indicator much more targeted in its message, and will contribute to its effectiveness in informing policies.

Once an indicator is designed to serve its users, it needs to be communicated to its audience. The outreach of indicators and the debates in this process are discussed in the next section.

Outreach of indicators

A significant challenge in communicating biodiversity indicators is reaching the groups that often do not have interest and requirement for a biodiversity indicator. However, these groups may have significant impacts on biodiversity: for example development (Bubb *et al.* 2005) and agricultural sectors. One of the approaches suggested in Bubb *et al.* (2005) to ensure the use of prepared indicators is to establish contacts with potential user groups during the preparation of indicators. Thus the questions of a particular group would be fully understood and addressed by an indicator. As a result, the users will recognize this tool as designed for their needs and will accept it.

The second approach is to lobby for an indicator uptake at stage after an indicator has already been prepared. However, when lobbying, parties should focus on communicating the message of an indicator and in convincing potential user groups of the relevance of this message to them. If presenting an indicator that suggests pressure on the environment by developers, it is a significant challenge to convince them to take the indicator up. This challenge results by the difficulty to relate specific impact to specific change in an indicator. Additional challenge would be consideration of needs of conservation organization because it can result in a conflict. This suggests that meeting expectations of a variety of users with conflicting priorities should be carefully considered prior to an indicator preparation.

When showing trends on a large scale (national and international), it is very challenging for indicators to supply information on specific environmental problems and to identify key sources of impacts that would be reflected by the changes in an indicator. Identifying the outcomes of specific policy responses is even more challenging for an indicator. When used as a communication tool, indicators can indeed have a role in awareness building, but without suggesting the possible sources of impact.

To interpret changes in the status of threatened species (using birds as an example), Butchart *et al.* (2005) suggest that an assessment for Red Listed species should be ac-

companied and analyzed in the light of the pressures that influence the species. Thus impacts will be anticipated, because the pressures will be listed and changes in Red List status will suggest which pressures are most acute. A challenge here might be to quantify the cumulative impact by various pressures. However, indicators in general rarely provide a complete description of a problem. Nevertheless, Romstad (1999) suggests that indicators should not be used in isolation from other pertinent information available to decision makers.

All of these factors contribute to the acceptance or rejection of an indicator by decision makers. To assess the effectiveness of indicators in informing policies and practice, different levels of indicator uptake should form part of a tool to measure the role of indicators in informing policies.

SCALE FOR INDICATOR UPTAKE ASSESSMENT

A scale for indicator uptake assessment is proposed here as a tool for assessing the effectiveness of an indicator. The scale is based on the factors affecting indicator uptake and the components of the Wild Bird Index uptake process. This hypothetical scale is designed to be applied at different levels of decision-making: local, national and

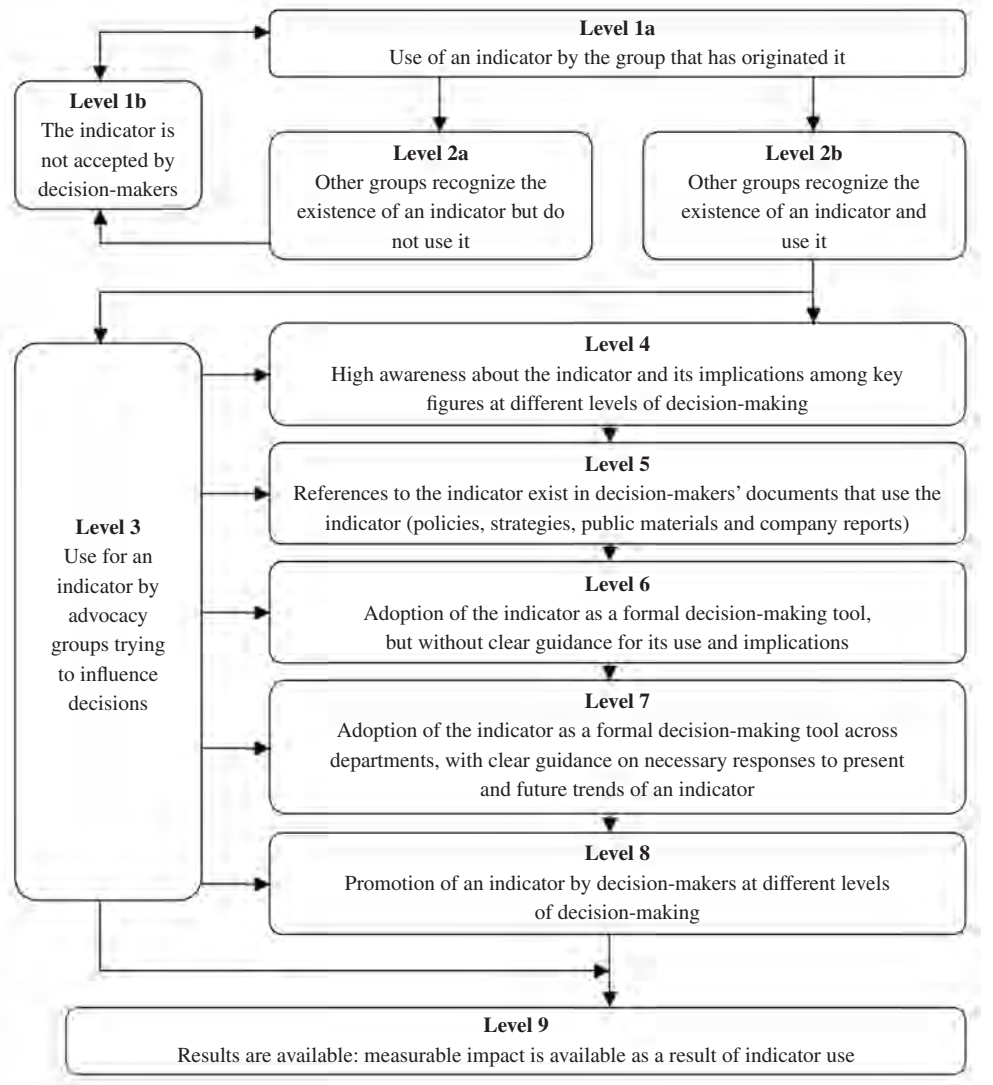

Figure 2. Scale for indicator uptake assessment.

Table 1. Stages of indicator use.

Scale	**Basic use** (1 point)	**Advanced use** (2 points)	**Optimum use** (3 points)
Level 1a: Use of an indicator by the group that has originated it.	The group is updating the indicator but uses it for its internal purposes only (e.g. volunteers recruiting).	The indicator is used in publications for the wider public but without active lobbying.	The indicator is used for active lobbying and communication by the organisations that have developed it, but there are no responses from the decision-makers that are lobbied.
Level 1b: The indicator is not accepted by decision-makers.	Decision-makers are not aware of the indicator and no lobbying is happening.	The government is aware of the indicator but there are no requirements for the uptake of the indicator.	Decision-makers know about the indicator, there are requirements but at this stage data is only now being collected.
Level 2a: Other groups (decision-makers and advocacy groups) recognize the existence of an indicator but do not use it.	The indicator is not used because of its quality and / or decision-makers are developing alternative indicators.	It is stated that not enough time has passed from the introduction of the indicator.	The indicator is not used because of political reasons that are out of its scope and qualities: scientifically robust but not effectively used.
Level 2b: Other groups recognize the existence of the indicator and use it.	The indicator is currently in a process of adoption by the government.	The indicator is adopted but does not comply even with the minimum reporting requirements.	The indicator is officially adopted by decision-makers but they use it to comply with minimum regulations only.
Level 3: Use of the indicator by advocacy groups trying to influence decisions.	Only the organisation preparing the index is using it for lobbying.	The indicator is used in a few publications and websites but is not well communicated to potential target groups.	The indicator is actively used in presentations and advocacy campaigns aiming at particular decision-makers in addition to the wider public.
Level 4: High awareness about the indicator and its implications among key figures at different levels in decision-makers.	Only some key decision-makers have high awareness about the need of an indicator.	The indicator is tested for its applicability, and decision-makers at different levels have high awareness about its use because they receive what they expect from the indicator.	The indicator is additionally optimized by including it in a set of other indicators or is used in with other indicators that are not a single set.
Level 5: References to the indicator exist in decision-makers' documents that use the indicator (policies, strategies, public materials and company reports).	The indicator is used for internal communication only or official publications are not known [by interviewees] to exist.	The indicator is used in statistics, grey literature for communications that would not directly influence policy decisions or to meet minimum requirements for reporting.	The documents are widely distributed to the public or the indicator is included in official planning documents like national strategies.
Level 6: Adoption of the indicator as a formal decision-making tool, but without clear guidance for its use and implications.	Decision-makers have adopted the indicator only to comply with regulations with little understanding of the indicator use, communicate passively and no guidance for the indicator preparation and use by the organisation that has prepared the indicator.	Decision-makers have adopted the indicator with no or minimal communication with the institution that has prepared it.	Decision-makers have initiated the dialogue for the indicator preparation, or actively communicate with the organisation that has developed the indicator aiming at understanding the indicator use.
Level 7: Adoption of	Only some of the relevant	All the relevant departments	The indicator is well integrated

continued

the indicator as a formal decision-making tool across departments, with clear guidance on necessary responses to present and future trends of an indicator.	departments are using the indicator.	are using the indicator as appropriate.	in the decision-makers' work to an extent that they are ready to fund the indicator preparation.
Level 8: Promotion of the indicator by decision-makers at different levels of decision-making.	Decision-makers are promoting the indicator to other potential stakeholders at the same level of decision-making.	The indicator has become a headline indicator in the country. Decision-makers explore other means of regulations and communications to a targeted audience of developers.	A target is set for the indicator.
Level 9: Results are available: measurable impact is available as a result of indicator use.	NGOs have suggested that changes in policies or awareness resulted from the use of indicators one of which is the Common Birds Index.	An official has estimated that the indicator has been one of the factors for changes in policies, but evidence is not available.	Published evidence is available to suggest that changes in policies on species and habitats conservation were decided mainly on the basis of the indicator.

international. The scale is designed in consultation with practitioners on the Wild Bird Index at a national and European level.

The scale starts from recognising the existence of an indicator, proceeds through routine use by decision-makers, and ends with measurable outcomes (Fig. 2). As suggested in Fig. 1, these outcomes would not end the process of indicator use, but through changes of awareness and questions of user groups, decision-makers should follow public expectations and ensure the most appropriate outcomes from their decisions.

Each of the levels of this scale includes three stages of indicator use: 'basic', 'advanced' and 'optimum' (see Table 1). For each of the stages are given points from 1 to 3 for indicator use at each level. These points will facilitate the final assessment of indicator use. A detailed legend and description of each level is given in the next section.

Scale interpretation

This section includes some of the factors and processes that need to be considered to understand the levels and stages of indicator use. In addition this section describes some of the frameworks for analysis that need to be considered when setting points.

Each of the levels and stages of indicator use needs careful consideration when interpreting and setting points for assessment. Because of complexity of decision-making, additional guidelines are given below that aim to facilitate the assessment process.

Level 1

This initial level of the scale treats some of the reasons for the level of indicator use. Thus if an indicator is not accepted by decision-makers, this might be because they are not aware of the indicator's existence ('basic' level), or they are aware but there is no incentive or regulation to make them use it (level 1b, 'advanced'), or there is active lobbying but not enough time has passed for the decision-makers to use the indicator (level 1b 'optimum' level).

Level 2

The second level from the scale treats the perceptions of decision-makers about the indicator use. At this initial stage of the scale, a distinction is made between two types of indicators: the first (2a) are indicators that are still not accepted, either because of their quality or because of inadequate communication, and the second (2b) are good quality indicators that can continue to be tested for uptake by decision-makers at higher levels. The consequences of rejection at level 2a can be either revision of an indicator and a return to level 1a, or abandonment of the indicator, even by the group that has designed it. The perceptions of decision-makers assessed at this level can have significant impact on the final indicator effectiveness.

An important level and stage is 2b. 'advanced' where countries are considered to have introduced the indicator only because of the EU Rural Development Regulations. When interpreting this statement one should distinguish between the willingness for change of indicators from one to another to comply with the EU regulations, and the obligation decision-makers may feel to use and reporting on

an indicator requested by regulations. In both of the cases countries adopt indicators because of regulations. However, in the first case governments change the indicator from one to another which suggests much more positive perception. In this case governmental officials look at the indicator as an opportunity for capacity building. In the second case the indicator preparation is much more obligatory with no positive perceptions from decision-makers. In these cases the indicator use can be done only because of regulations. The results from such analysis on the perceptions of decision-makers can affect the points given for the current level 2. Moreover, this level suggests one of the key factors playing a role in the final score for the level of indicator use.

Level 3

This level treats the use of an indicator by advocacy groups different from the institutions that had prepared it. In addition, it treats the level of communication from the advocacy groups to decision-makers. Thus countries may not perform best in the process of indicator use if an indicator is used only by the organisation that had prepared it. However, an indicator can reach the highest levels of its effectiveness if a party advocates for its use.

Level 4

This level describes the awareness of decision-makers about the practicality of using an indicator. The high awareness of decision-makers is one of the initial stages of its use. Thus if only some decision-makers have high awareness (4.1), an indicator might not be well integrated in the programme of relevant departments.

Including an indicator in a set of other ones suggests that the high awareness of decision-makers has been applied for reaching the optimum use. Thus if the Wild Bird Index is included in a set of economic and social indicators, this would suggest that biodiversity is equally important to decision-makers. As a result the framework for assessment shall treat all indicators equally. Thus there might be certain 'competition' among priorities and it is not known to what extent each of the indicators in the set will be used. It is possible that an indicator is used with other ones because of regulations. However in this case, the indicator use will not be that effective and additional evidence should be sought to identify measurable outcomes from indicators use.

Level 5

This level refers to the evidence for indicator use and its integration into the decision-making processes. As evidence would be treated references to the indicator in official publications. Thus if no publications are known to exist, the stage of indicator use will be the lowest in this level ('basic'). If references to the indicator exist in statistics, grey literature like presentations and personal communications, the level of indicator use will be advanced ('advanced'). At last if references to the indicator exist in official planning documents like strategies, the indicator use will be 'optimum' for this level.

Level 6

This level concerns the communication between decision-makers and the institutions developing an indicator. The communication can be passive, where decision-makers prefer to consult indicators different from the proposed ones ('basic'). In other cases an indicator use is done with only minimal communication with the institution that has prepared it ('advanced'). If decision-makers communicate actively with the organisations preparing the indicator they create one of the pre-conditions for its effective use ('optimum' level). As a result of active communication, both decision-makers and conservationists receive what they expect from an indicator.

Level 7

This level treats the integration of an indicator within institutions' work. At the basic stage only some departments use the indicator. At the advanced stage, all the relevant departments use the indicator as appropriate. At the optimum indicator use the government has integrated an indicator in its work to an extent that it is ready to fund its preparation.

Level 8

This level treats one of the highest stages of indicator use, when decision-makers are convinced in the benefits of an indicator and are ready to promote it to other potential users. The first stage of this level refers to promotion of an indicator by decision-makers to other ones at the same level of governance but without any formal requirements. The second stage refers to promotion of the indicator for it being a headline indicator. This stage imposes some requirements on potential stakeholders for reporting. The third and highest stage of the indicator promotion suggests that the awareness of decision-makers is very high and the indicator is well integrated into the decision-making process: an indicator is promoted to other departments, so that governments are ready to set themselves a target for an indicator.

The promotion of indicator can have both positive and less positive aspects: promotion because of high awareness, and promotion with the aim to share responsibilities

and obligations. Thus if a Ministry of Environment is promoting the indicator because it is well aware of the benefits of the indicator, the overall performance and use an indicator will be effective. However, if a Ministry is promoting the indicator to share responsibilities and obligations, the indicator use will not be that positive. This suggests that if promotion to other decision-makers is requested by certain Ministry, the context in which the Ministry operates should be carefully considered for the final assessment.

Level 9

This level suggests that evidence should exist to prove the indicator use. However, because of the nature of indicators in general, it is challenging to attribute the results of a specific decision to an indicator only. Evidence can be conclusive if studies were conducted and published to prove that changes in indicators reflect changes in policy.

On the basis of the legend above, points will be given for each level and stage of indicator use. For the final assessment, the points need to be added. The different levels of effectiveness of indicator use are discussed in the nest section.

Use of the scale as a tool for assessment

The use of the tool for assessing indicators use can provide only very conditional score for the level of indicator effectiveness in informing policy and practice. It is not possible to simplify all the political issues involved in decision-making and the way an indicator is used. Thus the scale does not pretend to be comprehensive. However it has captured the major issues that have significant impact on the indicator use. In addition, the tool can be used to compare identical levels of indicator use across countries on the basis of the issues and processes identified in the scale.

Some of the main concerns on the use of the tool are the variety of issues and factors that can be involved in the decision-making process. All of these issues concern different aspects of indicator use, which can vary in chronology according to the local circumstances. Thus a country may perform well at high levels of the scale but not that well at lower ones. That is why the overall use should be taken into consideration for the final level of uptake to be assessed. Thus a direct conclusion on the level of uptake is difficult to make with consideration of the highest level only. Instead, a cluster of responses should be considered to identify the level of indicator uptake in a country.

To conduct the actual assessment, at each of the levels from the scale are given points from 1 to three (see Table 1). One point is given when an indicator is used at a very basic stage of a level and suggests 'basic'. Two points are given at an 'advanced stage' of a level and three points are given for an optimum use of an indicator at each level. The maximum score that can be achieved is 27 points (9 levels * 3 points at each level) (see Table 2). The minimum level cannot be suggested because it is strongly related to political frameworks and varieties of circumstances.

The overall performance is assessed according to the following scale:

Table 2. Scores for effectiveness assessment.

Effectiveness	Points
Highest	23-27
Advanced	18-23
Good	12-18

The highest effectiveness in an indicator use suggests that its message is best optimized, results from its use are available and the public has high awareness about an indicator. The use of an indicator is 'advanced' when at least several of the levels have been fulfilled at 3 points. An indicator will have 'good' effectiveness when the parties assessed make efforts in incorporating the indicator into their work but still need to optimize the indicator preparation.

FACTORS INFLUENCING DECISION MAKING

Indicators can provide understanding about the state of biodiversity, which is crucial in dilemmas between development and conservation (Failing and Gregory 2003). However, there are often a variety of factors influencing decision-making and the selection of outcome scenarios, which result in different levels of indicator uptake according to the scale above (Fig. 2). Some of these suggested by Kapos (pers. comm.) can be:

- time since introduction of an indicator;
- number of groups using an indicator in their advocacy;
- types of advocacy - how explicitly have the policy links between the indicator and the user group been made clear;
- actual trends in an indicator;
- explicit local scientific support for it;
- degree to which relevant issues are dealt with by the same parts of government.

In addition,

- awareness of the public and 'pressure' on decision makers from the public and the media is also a factor that influences decision-making according to the proposed scheme for indicator use given in Fig. 1;

• existence of national and international regulations can also have a significant impact on the use of indicators. Because of the high complexity of these factors, the uptake of indicators at a higher level of the scale above does not imply that all the other levels have to be met. However, to assess the role of these factors for indicator uptake, further research needs to be done.

To assess indicator uptake, the scale proposed above should be used for comparing the existing levels of indicator use with the theoretical framework given in this tool. Intermediate cases between and across levels are possible according to specific circumstances. However, on the basis of comparison and analysis, the general level of indicator uptake will be identified together with some of the factors influencing this level of use. As a result, conclusions can be drawn on the use and effectiveness of indicators in informing policy.

CONCLUSION

There has yet to be an assessment of indicator's role in informing policies and practices in Europe. To facilitate such an assessment, this study proposes a tool that is expected to stimulate further research on the role of the WBI and other indicators worldwide. The designed tool is expected to provide better understanding of indicator uptake processes. As a result, a more comprehensive approach will be undertaken towards the design of future biodiversity indicators for assessing the rate of loss of biodiversity by 2010.

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