CBD

UNEP

CONVENTION ON BIOLOGICAL DIVERSITY

Distr.
GENERAL

UNEP/CBD/SBSTTA/8/8/Add.3
28 November 2002

ORIGINAL: ENGLISH

SUBSIDIARY BODY ON SCIENTIFIC, TECHNICAL AND TECHNOLOGICAL ADVICE
Eighth meeting
Montreal, 10-14 March 2003
Item 5.1 of the provisional agenda*

INLAND WATER ECOSYSTEMS: REVIEW, FURTHER ELABORATION AND REFINEMENT OF THE PROGRAMME OF WORK

Work plan for developing methods and techniques for the valuation of goods and services of inland water ecosystems, incentives and policy reform, and the understanding of ecosystem function

Note by the Executive Secretary

EXECUTIVE SUMMARY

In the programme of work on biological diversity of inland water ecosystems contained in annex I to decision IV/4, the Conference of the Parties requested a work plan for the Subsidiary Body on Scientific, Technical and Technological Advice to be developed in co-operation with relevant organizations, Governments and Parties that should build upon the ongoing efforts in inland water ecosystem conservation. The work plan was to include, *inter alia*, "developing methods and techniques for the valuation of goods and services of inland water ecosystems, incentives and policy reform, and the understanding of ecosystem function". The present note provides background information pursuant to this request and, in its annexes, provides a description of two economic instruments—"wetland mitigation measures" and "tradable water rights"—that have a specific focus on solving water-related management problems (annex I) and an indicative list of functions of inland waters that are directly or indirectly derived from biological diversity (annex II). A more detailed description of the basic principles, methods and techniques of economic valuation, incentive measures for the conservation and sustainable use of inland water biodiversity, and inland water ecosystem functioning is expected to be provided in an information document on the subject.

SUGGESTED RECOMMENDATIONS

The suggested recommendations regarding economic valuation of inland water biodiversity are included under goal 2.3 of the proposed revised programme of work on inland water biodiversity and the

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consolidated suggested recommendations under item 5.1 as contained in the note by the Executive Secretary on elements for the further elaboration and refinement of the programme of work (UNEP/CBD/SBSTTA/8/8/Add.2).

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METHODS AND TECHNIQUES FOR THE VALUATION OF GOODS AND SERVICES OF INLAND WATER ECOSYSTEMS, INCENTIVES AND POLICY REFORM, AND THE UNDERSTANDING OF ECOSYSTEM FUNCTION

1. Inland water ecosystems provide a number of goods and services that are not directly traded on markets. While consumers are, in principle, ready to pay for these goods and services, the market mechanism fails to assign value to them. The process of economic valuation seeks to elicit these hidden values and thus measure the "total economic value", which includes not only direct-use values, but also indirect-use as well as non-use values of biodiversity, including ecosystem goods and services.

2. There are a number of methods and techniques for economic valuation. These tools, which are already widely applied, can elicit both use and non-use values. They can be classified into indirect and direct methods. Indirect methods make use of observable consumer decisions, for example on related markets, while direct methods are questionnaire-based and directly ask for the willingness-to-pay of a representative sample of consumers. These tools are not ecosystem-specific and can be fully applicable to inland water ecosystems.

3. Economic valuation demonstrates the value of ecosystem to private and public decision makers and stakeholders and thus raises awareness. However, being aware of the hidden costs of the degradation of inland water ecosystems is not sufficient if these costs are not adequately reflected or "internalized" in private and public decision-making. Incentive measures are policy tools that seek to accomplish such internalization. Incentive measures are classified as positive or negative. More detailed descriptions of incentive measures can be found in the note by the Executive Secretary on the subject prepared for the sixth meeting of the Conference of the Parties (UNEP/CBD/COP/6/12/Add.3). The removal or mitigation of perverse incentives (for example, some fertilizer and irrigation subsidies) is an important entry point for policy reforms. As the principles of most of these incentive measures are not ecosystem specific, they can be applied to the management of inland water ecosystems. However, instruments such as the "wetland mitigation banking" and "tradable water rights" (see annex I below for a description of these instruments) have a specific focus on solving inland water-related management problems.

4. An indicative list of functions that are directly (flora and fauna) or indirectly (services provided by ecosystems) derived from biological diversity of inland water ecosystems is presented in annex II below. In order to understand these functions, it is necessary to have a comprehensive knowledge of their biological, physical and chemical components, their complex and dynamic interactions, and the factors affecting these parameters. In this context, the following elements are usually assessed and monitored: physico-chemical and hydrological parameters (including water quality, water use, water flow and abstraction); climatic, political and socio-economic factors (including resource needs and values); and biodiversity composition at the genetic, species and ecosystem levels, its structure in time and space, and its role of each of their components. */

5. Standard methods and techniques are available for the assessment of these factors in most inland water ecosystems. However, limited information is available to policy and decision makers, particularly in relation to the use value assigned to the biodiversity and the actual consumption of biodiversity.

6. Local resource users frequently have in-depth knowledge of inland waters and of the ecology of the main species as well as an understanding of their role within the larger system. Their contribution to developing an understanding of inland water ecosystems can therefore be particularly valuable.

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*/ A list of these parameters may be found in appendix 4 to the Guidelines for Incorporating Biodiversity-related Issues into Environmental Impact Assessment Legislation and/or Processes and in Strategic Environmental Assessment, endorsed by the Conference of the Parties in its decision VI/7 A.

7. Recognizing that the comprehensive information about the function of inland water ecosystems is invaluable to land and resource-managers for planning, evaluating and executing plans and programmes, SBSTTA might wish to invite relevant organizations and experts to compile existing information and disseminate it in a format that is useful to policy makers. Emphasis should be placed on assessment of and research on factors that affect ecosystem functions and on remedial action to restore ecosystem functions.

Annex I

"WETLAND MITIGATION BANKING" AND "TRADABLE WATER RIGHTS"

Wetland mitigation banking

Wetland mitigation banking aims at increasing flexibility for developers (compared to conventional regulation), while generating incentives for private investments into wetland conservation and enhancing the quality of wetland conservation policies. It does not require a specific constellation of existing property rights on inland waters. Wetland mitigation banking policies establish and mark off large areas, including both important intact and degraded wetlands. The policy objective is to constantly improve wetlands in wetland mitigation banking -areas by conservation or restoration activities. By financing some of these activities, private investors obtain a certain amount of wetland mitigation banking -credits, as soon as the site concerned is rehabilitated completely. These credits can be kept to hold the right to develop different wetland areas. They can also be sold to developers who have not invested but intend to develop specific areas. Hence, credits can be traded on purpose-built markets. Such credits are denominated in "habitat units". The ratio of habitat units obtained per dollar invested depends on the success of the restoration. That means such investments are risky, because of the uncertainty of their outcome. Minimizing the risks of the investment through careful planning maintains the incentive to invest.

Tradable water rights

Water users often pay only a fraction of the costs associated with consumptive water use and transportation. Policies such as drastically raising water charges or confiscating water from the holders of water rights are often politically not feasible. However, while leaving the underlying system of water rights unchanged, Governments may establish incentives for more efficient use by allowing the trade of water rights. Water markets, as well as tradable water rights, check growing freshwater scarcity by balancing demand and supply rather than expanding only the supply side. Like any trading activity, markets may generate social surplus by efficiently reallocating resources. Farmers, as rights holders, can obtain extra income by using more efficient irrigation techniques or by cultivating less water-intensive crops, and selling surplus water rights. However, a number of important preconditions have to be met. The transferability of water and/or water rights must be technically and legally ensured. Any system of tradable water rights has to take care of in-stream uses and of out-of-aquifer transfers. Moreover, a free and public registry for water rights has to be established in order to formalize property. Therefore, minimal institutional capacities and sanction mechanisms have to exist.

Annex II

INDICATIVE LIST OF FUNCTIONS OF INLAND WATERS THAT ARE DIRECTLY (FLORA AND FAUNA) OR INDIRECTLY (SERVICES PROVIDED BY ECOSYSTEMS) DERIVED FROM BIOLOGICAL DIVERSITY

Production functions

Natural production

- Timber production
- Firewood production
- Production of harvestable grasses (construction and artisanal use)
- Naturally produced fodder and manure
- Harvestable peat
- Secondary (minor) products
- Harvestable bush meat (food)
- Fish and shellfish productivity
- Drinking water supply (household consumption)
- Supply of water for irrigation and industry
- Water supply for hydroelectricity
- Supply of surface water for other landscapes
- Supply of ground water for other landscapes

Nature-based human production

- Crop productivity
- Tree plantations productivity
- Managed forest productivity
- Rangeland/livestock productivity
- Aquaculture productivity (freshwater)

Carrying functions*:*

Suitability for

- Constructions
- Indigenous settlement

- Rural settlement
- Urban settlement
- Industry
- Infrastructure
- Transport infrastructure
- Shipping
- Road transport
- Rail transport
- Air transport
- Power distribution
- Use of pipelines
- Leisure and tourism activities
- Nature conservation

Processing and regulation functions

Land-based processing and regulation functions

- Decomposition of organic material (land-based)
- Natural desalinization of soils
- Development/prevention of acid sulphate soils
- Biological control mechanisms
- Seasonal cleansing of soils
- Soil water storage capacity
- Soil protection

Water-related processing and regulation functions

- Water filtering function
- Dilution of pollutants function
- Discharge of pollutants function
- Flushing / cleansing function
- Bio-chemical/physical purification of water
- Storage for pollutants function

- Flow regulation for flood control
- River base flow regulation
- Water storage capacity
- Ground water recharge capacity
- Regulation of water balance
- Energy exchange between land and atmosphere
- Climate regulation
- Sedimentation / retention capacity
- Protection against water erosion
- Prevention of saline groundwater intrusion
- Prevention of saline surface-water intrusion
- Transmission of diseases

Biodiversity-related regulation functions

- Maintenance of genetic, species and ecosystem composition
- Maintenance of horizontal and vertical spatial structure, and of temporal structure
- Maintenance of key processes for structuring or maintaining biological diversity
- Maintenance of pollinator services

Signification functions

Cultural/religious/scientific/aesthetic landscape functions
