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**MEETING OF THE PARTIES TO THE CONVENTION ON
THE PROTECTION AND USE OF TRANSBOUNDARY
WATERCOURSES AND INTERNATIONAL LAKES**

Working Group on Integrated Water Resources Management

Second meeting
Geneva, 26–27 June 2006
Item 13 of the provisional agenda

**DRAFT CODE OF CONDUCT ON PAYMENTS FOR ECOSYSTEM SERVICES IN
INTEGRATED WATER RESOURCES MANAGEMENT**

Prepared by a drafting group
with the assistance of the secretariat and a consultant*

1. Ecosystems provide a wealth of services that are fundamental for proper environmental functioning and economic and social development. While the demand for these services, including provision of clean freshwater, is continuously increasing, the capacity of ecosystems to provide such services is hampered by their ever-growing degradation, which diminishes the prospects of sustainable development. This has many causes (e.g. economic growth, demographic changes), not least the fact that the value of such ecosystem services is often not captured and not included in decision-making. Such decisions tend to prefer investments in water-related infrastructure (e.g. dams for flood control, water filtration plants for drinking water) rather than improving the capacity of water-related ecosystems to, for example, mitigate floods and purify water.

* This document is being issued on the above date as the drafting group held its last meeting on 11–12 May 2006.

2. Recent decades have seen increasing application of the ecosystem approach to water management encompassing, *inter alia*, inland water resources, wetlands, floodplains, terrestrial ecosystems and associated wildlife as well as habitats and human beings. In the UNECE region, the *Guidelines on the Ecosystem Approach in Water Management* (UNECE, 1993) promoted the idea that water resources should not be managed in isolation from other ecosystem components, such as land, air, living resources and humans, present in a river basin. The river basin was thus considered as an entire ecosystem. The protection, restoration and sustainable use of its components are essential for the sustainability of water resources management.
3. The ecosystem approach is firmly embedded in the 1992 UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Water Convention). At their third meeting (Madrid, November 2003), the Parties decided to include in the 2004–2006 work plan two seminars related to the ecosystem approach in water management: the first on the role of ecosystems as water suppliers (Geneva, 13–14 December 2004) and the second on environmental services and financing for the protection and sustainable use of ecosystems (Geneva, 10–11 October 2005). Government officials and experts from international organizations, non-governmental organizations (NGOs) and the private sector attended both seminars.
4. At the first seminar, participants highlighted the role of water-related ecosystems in water management and made recommendations for effective implementation of the ecosystem approach. The importance of mechanisms to finance the protection and restoration of water-related ecosystems was particularly stressed. The seminar's recommendations are presented in the brochure "Water for Nature – Protecting Water-related Ecosystems for Sustainable Development"¹. The recommendations focused on five essential pillars to promote the integration of the ecosystem approach into integrated water resources management (IWRM) and thereby counteract the degradation of these ecosystems.
5. In recent years, innovative financing mechanisms and, more specifically, payments for ecosystem services (PES) have been recognized as essential for addressing some of the identified failures in environmental management. PES schemes make it possible to take into account environmental externalities. In a situation of high environmental concerns and limited financial resources, PES can generate additional alternative resources, divert funds to environmentally friendly management practices and sustainable production patterns, create incentives for investment, and increase the involvement of the private sector in environmental protection.
6. The second seminar primarily focused on mechanisms for payment for services provided by such water-related ecosystems as forests and wetlands, which are constituent parts of river basins, whether transboundary or not.
7. This seminar's recommendations appear in the brochure "Nature for Water – Payment for Environmental Services"². It explains how the establishment of PES can contribute to solving water management problems, and what legal, administrative and institutional arrangements are needed to implement PES. A basic understanding of ways and means to value ecosystems is

¹ Available at www.unece.org/env/water/meetings/ecosystem/Brochure_final.pdf.

² Available at www.unece.org/env/water/meetings/payment_ecosystems/brochure.pdf.

provided together with an explanation of the underlying principles of various PES schemes. The brochure also highlights other measures to support the implementation of PES.

8. As a follow-up to the two seminars, the seminar participants proposed to draw up a code of conduct on payments for ecosystem services in integrated water resources management.

9. Annex I to the current document contains the draft version of the main body of the Code of Conduct. It explains the objectives and scope of the Code of Conduct and provides a set of strategic, rather than technical, recommendations for the various steps involved in establishing and operating various schemes for PES. The other annexes,³ which are of a technical nature, provide a flow chart related to the decision-making process involved in establishing PES (annex II); an explanation of valuation methodologies (annex III); a description of types of PES and financial arrangements (annex IV); examples of PES (annex V); and elements in support of PES in international forums (annex VI).

10. The Working Group may wish to:

(a) Examine the recommendations contained in the draft Code of Conduct (annexes I–VI);

(b) Endorse the draft Code of Conduct in principle with the understanding that the outcome of the discussion during the meeting of the Working Group and further suggestions for amendments and additions by representatives of the Parties to the Convention, to be provided to the secretariat by **15 July 2006** at the latest, will be incorporated;

(c) Request the secretariat to submit the draft Code of Conduct, as updated, to the Parties to the Convention for adoption at their fourth meeting;

(d) Express gratitude to the Swiss Federal Office for the Environment for its leadership in the development of the draft Code of Conduct and the financial contributions made;

(e) Express its appreciation to the representatives of the Swiss Federal Office for the Environment; the designated experts from Finland, Germany, Hungary, Italy and the Netherlands; the representatives of the UNECE Timber Committee secretariat; the United Nations Environmental Programme (UNEP); the Food and Agriculture Organization of the United Nations (FAO); the Ramsar Convention secretariat; the World Conservation Union (IUCN); the Liaison Unit of the Ministerial Conference on the Protection of Forests in Europe (MCPFE); the Regional Environmental Centre for Central Asia (CAREC); WWF; and the Water Convention's secretariat for the substantive work done;

(f) Propose to the Meeting of the Parties a follow-up activity relating to the practical implementation of the Code of Conduct (see document ECE/MP.WAT/WG.1/2006/4), which should also result in an updating of the code, based on experience gained; and

³ For technical reasons, annexes II–VI are being issued as a separate document.

(g) Invite the Meeting of the Parties to consider distributing the Code of Conduct as widely as possible.

Annex

**DRAFT CODE OF CONDUCT ON PAYMENTS FOR ECOSYSTEM SERVICES IN
INTEGRATED WATER RESOURCES MANAGEMENT**

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INTRODUCTION

1. Payments for ecosystem services (PES) have the potential to be an environmentally effective, economically efficient and socially equitable tool for implementing integrated water resources management (IWRM). PES schemes complement other approaches, such as command and control.
2. The Code reflects good practices in order to support Governments at all levels of decision-making (global, regional, transboundary, national and local) in the implementation of PES. It also addresses joint bodies, such as international river and lake commissions, and other appropriate institutional arrangements for cooperation between riparian countries.
3. The Code also guides other actors, such as suppliers and users of ecosystem services, in the protection, restoration and sustainable use of water-related ecosystems and the establishment of PES.
4. One of the Code's basic functions is to serve as a point of reference, particularly until such time as Governments have adapted their national legislation and applicable bilateral and multilateral agreements on transboundary waters.
5. The recommendations of this Code were specifically prepared to assist Governments, joint bodies and other actors in the UNECE region. However, these recommendations could also be applied, as appropriate, in other regions.
6. The recommendations of this Code are not legally binding, and the Code does not supersede the legal obligations arising from the Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Water Convention) or other agreements on transboundary waters.

I. OBJECTIVES

1. The main objective of this Code is to provide guidance on the establishment and use of PES to implement IWRM through the promotion of the protection, restoration and sustainable use of water-related ecosystems at all levels, from local to transboundary.
2. The Code is intended to provide guidance in the further implementation of the provisions of the Water Convention and its related Protocols to prevent, control and reduce impacts, whether transboundary or not, on the environment, including human health and safety.
3. The Code specifically intends to support the establishment of well-designed PES schemes and thereby to:
 - (a) Raise awareness among all stakeholders, including landowners and water users, of the benefits of using PES to protect, restore and sustainably use water-related ecosystems;

- (b) Improve the quality of, and facilitate the integration of, relevant policies at all levels and sectors pertaining, among other things, to land use, urban development, water, energy and transport, thereby promoting efficiency, effectiveness and equity;
- (c) Contribute to the establishment of markets for ecosystem services; and
- (d) Broaden and diversify the financial basis for ecosystem protection, restoration and sustainable use.

4. The Code also intends to improve the overall framework for the protection, restoration and sustainable use of ecosystems and their services by present and future generations. It is an important contribution towards achieving the Millennium Development Goals (MDGs), the targets of the Johannesburg Plan of Implementation and more generally the recommendations of Agenda 21. It also contributes to achieving the goals of multilateral environmental agreements and promotes synergies and interlinkages among them.

II. DEFINITIONS

For the purpose of this Code,

1. “*Ecosystem*” means a dynamic complex of plant, animal and microorganism communities and their nonliving environment interacting as a functional unit. Ecosystems vary from relatively undisturbed ones, such as natural forests, to landscapes with mixed patterns of human use and ecosystems that are intensively managed and modified by humans, such as agricultural land and urban areas.
2. “*Water-related ecosystems*” means ecosystems such as forests, wetlands, grasslands and agricultural land that play vital roles in the hydrological cycle through the services they provide.
3. “*Ecosystem services*” means the benefits people obtain from ecosystems. These include *provisioning services* such as food, water, timber and fibre; *regulating services* that affect climate, floods, disease, wastes and water quality; *cultural services* that provide recreational, aesthetic and spiritual benefits; and *supporting services* such as soil formation, photosynthesis and nutrient cycling.
4. “*Water-related ecosystem services*” means services referred to in paragraph 1 of Chapter III of this Code.
5. “*River basin*” means the area of land from which all surface runoff flows through a sequence of streams, rivers and possibly lakes into the sea at a single river mouth, estuary or delta, or the area of land from which all surface runoff ends up in another final recipient of water, such as a lake or a desert.

6. “*Sub-basin*” means the area of land from which all surface runoff flows through a sequence of streams, rivers and possibly lakes to a particular point in a river, normally a lake or a river confluence.⁴
7. “*Payments for ecosystem services (PES)*” means a contractual transaction between a buyer and a seller for an ecosystem service or a land use/management practice likely to secure that service.⁵
8. “*Local*” refers to all relevant levels of territorial unit below the level of the State.
9. “*Institutions*” means legal persons having public responsibilities or functions or providing public services. Institutions include national and local ministries and agencies, joint bodies for transboundary cooperation, and institutions of regional economic integration organizations. Consequently, “*institutional arrangements*” means arrangements among these bodies.

III. SCOPE

1. The Code applies to payments for water-related ecosystem services, including flood prevention, control and mitigation; regulating runoff and water supply; improving the quality of surface waters and groundwaters; withholding sediments, reducing erosion, stabilizing river banks and shorelines and lowering the potential of landslides; improving water infiltration and supporting water storage in the soil; and facilitating groundwater recharge.
2. The Code mainly deals with forests, wetlands and grasslands as the main ecosystems which can provide the above-mentioned services. Other ecosystems, such as agricultural land and urban areas, also affect the water cycle within the basin and are referred to.
3. The Code covers the following types of PES schemes: public, private and trading schemes. These schemes are described in section C of Chapter V of the Code and in annexes IV and V.

IV. WATER-RELATED ECOSYSTEM SERVICES

A. Water management problems and links with ecosystem services

In a river basin, various water uses may compete or even be in conflict with each other, thus creating management problems, particularly if water is scarce and/or its quality is deteriorating. Knowledge about economic development patterns is important for understanding how water

⁴ Synonyms commonly used for basins and sub-basins are “catchment” and “watershed”.

⁵ The term “payments for ecosystem services” is not universally adopted. Depending on the cultural and political context, other terms such as “recompense”, “compensation” or “reward” may be used. PES projects are also referred to as “improved management of hydrological resources” or “reciprocal arrangements”. Payments for ecosystem services are sometimes called “incentive-based cooperative agreements”, “stewardship payments”, “compensatory schemes” or even “performance payments”.

management problems may worsen in the future. Examples of water management problems include competing forms of water use in a country (e.g. drinking water, water for industry, water for irrigation, and water for the maintenance of ecosystems' functions) and differing upstream-downstream interests of riparian countries (e.g. hydropower production in an upstream country and irrigational water use or navigation in a downstream country). Examples also include the adverse impact of flooding on human health and safety; the effects of excess nutrients, heavy metals and other chemicals in surface water or groundwater on drinking-water use; the effects of pollution by hazardous substances, such as pesticides, on aquaculture; and the effects of suspended and bottom sediments on hydropower production.

To address these water management problems, existing ecosystem services or their enhancement can be helpful. Water-quantity-related ecosystem services, such as flood protection and water regulation (run-off, infiltration, retention and storage), could be provided through forestation, conservation agriculture⁶ and flood plain restoration. Water-quality-related services, such as curbing water pollution, could be provided through extensification of (agricultural) land use, integrated pest management; pollution quotas and conversion or restoration of natural land cover. Other water-quality-related services, such as water purification services, can be provided through wetlands restoration or creation and paddy cultivation. "Bundling" of services may also be considered: for example, water-related services of forested land can be bundled with carbon sequestration; and services of wetlands and flood plains can be bundled with biodiversity services of these forms of land use.

It is therefore recommended that:

1. Water management problems in a given basin, including threats to water quantity and quality, should be identified and listed. This information is usually available, for example, as part of river basin management plans as well as monitoring and assessment activities.
2. The next step is the search for information to find out what was done in the past to address these water management problems and to ascertain what has worked and why a given solution failed. After that, it is necessary to decide which problems should be addressed first.
3. Once priorities have been established, an analysis should be made to see whether these water management problems could be addressed by an ecosystem solution (e.g. enhancing ecosystem services through changing land use), through water construction work (e.g. building dams and dykes, construction of drinking-water filtration plants) or command-and-control policies. In some cases, an effective solution to a water management problem may be a combination of ecosystem services and command-and-control approaches or water construction work.

⁶ Conservation agriculture refers to a range of soil management practices that minimize effects on composition, structure and natural biodiversity and reduce erosion and degradation. Such practices include direct sowing/no-tillage, reduced tillage/minimum tillage, non- or surface-incorporation of crop residues and establishment of cover crops in both annual and perennial crops. As a result, the soil is protected from rainfall erosion and water runoff; the soil aggregates, organic matter and fertility level naturally increase; and soil compaction is reduced. Furthermore, less contamination of surface water occurs and water retention and storage are enhanced, which allows recharging of aquifers.

4. If ecosystem services could contribute to solving the water management problem(s), a number of additional activities, outlined below, should be undertaken to lay the groundwork for the establishment of PES.
5. The geographical location and size of the various forms of land use in a basin, such as water bodies, forested areas, wetlands, grassland, agricultural land and urban areas should be identified. Existing land use inventories and soil maps are very helpful in this regard, and the use of geographic information systems could be considered.
6. A further sub-division of land use forms into hydrological units may be necessary. These units are relatively small areas within a river basin that are characterized by a certain type of soil (e.g. sand, silt, clay), a certain type of land use (e.g. coniferous forest, broadleaf forest, pasture, cropland) and a certain groundwater level (e.g. groundwater level within the reach of roots). As hydrological units of the same type have similar hydrological behaviour related, for example, to infiltration, evaporation and water storage, they help to clarify the “hydrological relations” in river basins and are one of the preconditions for determining whether ecosystem services in a given situation can be enhanced by changes in land use or management practices.
7. The biophysical relationships (i.e. the interactions in a basin between water, flora and fauna, soil, climate, landscape and the human population and settlements) should be analysed to the extent possible, and the water-related ecosystem services available in the river basin should be identified.
8. It is important to remember that ecosystems services change with time under the influence of factors such as vegetation growth and hydrometeorological conditions. The use of average data (e.g. mean annual data on precipitation, evapotranspiration, run-off) and/or maximum and minimum values are often insufficient to describe biophysical relationships and ecosystem services, particularly those related to flood control and groundwater recharge. Therefore, real-time data are needed.
9. Scale effects are also important. For example, the area of the basin/sub-basin and/or the area covered by a given form of land use is relevant for an assessment of flood protection services from forest ecosystems or the effect of extensification in agriculture on water quality. The effects of land use changes will be more pronounced if small sub-basins are considered; in large sub-basins or even transboundary basins, such effects may not be observed easily. Here models to simulate the effects of changing land use are useful.
10. Inter- and intra-sectoral cooperation are necessary to gather the needed information, including information about economic development patterns to estimate future pressures on water resources. Such cooperation is crucial for optimizing societal benefits.

B. Economic analysis of water-related ecosystem services

Economic analysis is an essential tool for efficient decision-making regarding the establishment of PES schemes (see section C of Chapter V and annex V). It provides a coherent framework that allows a comparison of the costs and benefits of changes in water-related ecosystem services in an integrated manner. It also provides a framework for assessing the distributional incidence of these costs and benefits among relevant stakeholders and the compensation which may be necessary to make sure that projects (such as a change in land use) and the associated use of PES schemes do not cause inequitable outcomes.

Cost-benefit analysis is the traditional tool for guiding decision-making in such matters. However, depending on the information available and the overall circumstances of the evaluation, other analytical tools like multi-criteria analysis,⁷ cost-effectiveness analysis⁸ and cost-utility analysis⁹ may also be useful and appropriate.

This analysis is a multi-step process that should involve:

- (a) The identification of the relevant water-related ecosystem services (see section A above);
- (b) The identification of the major stakeholders (see section B of Chapter V);
- (c) The assessment of the net benefits of changes in water-related ecosystem services that would result from a change in the use or management of the ecosystems; and
- (d) The analysis and assessment of the distribution of costs and benefits among major stakeholders and the design of any necessary compensation packages.

To carry out an economic analysis of water-related ecosystem services, it is recommended that:

1. Once the ecosystem services that can address existing or future water management problems have been identified (see section A above), the next step is to value the changes in the

⁷ Multi-criteria analysis (MCA) is a decision-making tool for a complex situation where overall preferences among options have to be determined and where each option accomplishes several desirable objectives selected by decision-makers. For each option there are predefined "criteria" (e.g. environmental and social indicators) which help to achieve the option. The measurement of these "criteria" need not be in monetary terms. The key output is the scoring, ranking and weighting of these options based on expert judgement. MCA is especially helpful in a context where the monetary valuation of environmental and social impacts is not possible.

⁸ Cost-effectiveness analysis (CEA) allows selection among alternative strategies to achieve a given environmental objective by comparing the costs of each strategy (measured in monetary units) with its environmental impact (measured in physical units). It allows ranking of policies (or projects) based on cost-effectiveness ratios in the context of a fixed budget, with the important implicit assumption being that all of these policies (or projects) are worth undertaking or that at least one of the projects must be undertaken.

⁹ Cost-utility analysis (CUA) is a tool used to guide decisions concerning the allocation of health services by comparing their costs with the associated health effects in terms of additional life years. But these health effects are converted based on some measure of the personal preferences of (or utility for) persons to be treated (quality-adjusted life-years, or QALY).

identified ecosystem services – that is, to weigh the total net benefits associated with specific scenarios (e.g. the conversion of cropland into grassland, or afforestation). Various valuation methods are available (see annex III), but uncertainties surrounding valuation outcomes may be large and require a precautionary approach (such as setting a safe minimum standard) in the decision-making. A precautionary approach is also mandatory in view of the risk that a change in ecosystem management may create irreversible effects. It is also important to find out whether valuation studies have been made in the past in the same area and for the same services, so that the outcome of previous studies can be used for comparisons and, possibly, for the transfer of benefits. This requires close examination of the previous studies and their overall economic, social and environmental context.

2. In carrying out a valuation exercise, it is important to keep in mind that:

(a) Scale effects are important. Valuation studies for small sub-basins often underestimate ecosystem values on the scale of the entire basin, because not all of the downstream effects are considered. However, the larger the size of the relevant water basin, the more difficult it is to assess the economic value of ecosystem services, and the more caution is needed when using results from model simulations of land use changes.

(b) The results of ecosystem valuation studies are site-specific but could be informative for other locations in the same basin or in a different basin.

(c) The values of many water-related ecosystem services can often be estimated only by means of indirect methods of valuation, because the services are not traded in actual markets. Depending on the method applied, the economic valuation of the same ecosystem service in a given water basin may therefore vary, even though the assessment is based on the same set of environmental and other data. Therefore, if possible, a range of values from different methodologies should be used. This may be comparable to the application of scenario techniques.

(d) Some ecosystem services cannot be easily measured or quantified because the necessary scientific, technical or economic data and/or the necessary budget to carry out a comprehensive and detailed valuation study are not available. In such cases, it may be necessary to adopt values from similar studies, adapting these values to local conditions using appropriate benefits transfer methodologies applied in other studies. In any case, the resulting values need to be treated with caution, and the sensitivity of recommendations to changes in these values derived from benefits transfer procedures should be examined.

(e) Ecosystem benefits that are related to attributes such as human life and safety or are of cultural or religious significance cannot be easily integrated into the economic valuation process. Ecosystem valuation may be inappropriate for addressing issues and qualities that cannot or should not be valued in monetary terms, because doing so can raise serious ethical questions.

3. Comparison of the net benefits of maintaining the status quo with the net benefits associated with the alternative scenarios provides the basis for deciding whether any of the

scenarios is worth implementing. The latter will, in general, be the case when the change in net benefits is positive and sufficiently large, taking into account the precautionary principle.

4. It is important to identify who would benefit from the change in ecosystem services and who would bear the costs (i.e. how the costs and benefits would be distributed among the various stakeholders using the services). Concurrently, one can address the issue of project financing and the need for compensation of those groups whose access to natural resources or water-related ecosystem services will be restricted. This assessment should allow for participation by all stakeholders.

5. Valuation should assist stakeholders in negotiating concerning the use of water-related ecosystem services and in reaching an agreement on the price of these services. These negotiations should, to the extent possible, be a stakeholder-driven and expert-informed process taking into account not only economic factors but also the social and political context in which the PES are to be implemented.

6. As the value of ecosystem services can change over time, the earlier assessment may need to be revised periodically.

V. ESTABLISHMENT AND OPERATION OF PES

A. Basic conditions and core principles

PES schemes are context-driven (tailored to the context of the specific basin or sub-basin under consideration), as their design is influenced by the ecological, social, economic and institutional conditions prevailing in the area where the scheme is to be implemented. There are basic conditions and core principles for the successful establishment and operation of PES.

It is therefore recommended that:

(a) Basic conditions

1. To promote the establishment of PES, political support should be created and maintained at all levels and across all sectors. Political support is also needed to adapt legislation, institutional arrangements and policies, where needed, and to provide an attractive political and legal environment for the private sector's participation (see section D below).

2. Potential buyers and sellers should be identified and their willingness to pay and sell, respectively, should be ensured.

(b) Core principles

1. The design and implementation of PES schemes should be considered as an adaptive learning process, taking into account lessons learned from other PES schemes.

2. The contracting parties to a given PES scheme should strive for environmental effectiveness by making sure that the PES scheme contributes to the sustainability of the water-related ecosystem services targeted by the scheme.
3. The contracting parties to a given PES scheme should strive for economic efficiency by making sure that the PES scheme is designed and implemented in the most cost-effective manner. This would include ensuring not only that the net benefits are maximized in the economic analysis, but also that the transaction costs of implementing the PES scheme are minimized. Contracting parties should explore the possibility of taking advantage of any synergies among ecosystem services by creating PES for bundles of ecosystem services (e.g. bundling services related to carbon sequestration or eco-tourism with services related to water retention and regulation) in order to minimize transaction costs.
4. The contracting parties to a given PES should make sure that no social inequities arise from the scheme. They should ensure that at the minimum no stakeholders are left worse off in absolute terms socially than before the PES were implemented, and that the social welfare relative distributive gap between stakeholders is no greater than it was before the PES was implemented.
5. Transparency should be ensured throughout the design and implementation of any PES scheme in order to promote trust between service sellers and buyers. Sharing of information and stakeholder participation in decision-making are imperative for a successful negotiation of PES contracts. The responsibility to ensure compliance with these principles lies with the entity which administers the PES scheme.
6. The contracting parties should also ensure that payments are made only if the agreed terms of the contract are respected.
7. The above steps require monitoring of the ecosystem services (see section A of Chapter VI). They also require mechanisms to be built into the PES scheme that allow for a revision of the PES contract.
8. Countries' fulfilment of obligations under transboundary and international agreements should not be conditional upon a payment for services provided by upstream ecosystems.

B. Stakeholder involvement

Payments for ecosystem services are multi-stakeholder affairs involving national and local governments, community groups, individual landowners, commercial enterprises, non-governmental organizations (NGOs) and donors. Making decisions on the most appropriate measures to achieve the objectives of river basin management plans, including the protection of water-related ecosystems, also involves balancing the interests of stakeholders. Therefore it is essential that the decision-making process be open to scrutiny by those who will be affected. Furthermore, transparency contributes to enforceability. The greater the transparency in establishing objectives, deciding on measures and reporting on achievements, the more care

stakeholders will take to implement decisions in good faith, and the greater the power of the public will be to influence decision-making and implementation, whether through consultation or, if disagreement persists, through dispute settlement procedures and courts.

It is therefore recommended that:

1. Policymakers should create favourable conditions for a dialogue at all levels and should facilitate public participation in decision-making, including at the local level, where most action takes place, thus building trust, ensuring ownership and improving cooperation.
2. A shared vision of the desired conditions for water and other related natural resources needs to be developed. Multidisciplinary teams should be set up and local consultations organized, both involving user groups and other stakeholders, to draw up such a shared vision, embedded in strategies for ecosystem protection and help with implementing water management plans.
3. Involving all stakeholders, including women, ensures ownership, upstream/downstream solidarity and the integration of local experience and traditional knowledge. Thus benefits for local populations, including indigenous people, and effects on economic and social development can be better demonstrated.
4. It is important to recognize that the private sector can make an important contribution, not only financially but also by sharing its wealth of practical experience. Commercial enterprises are important buyers of ecosystem services, as when hydroelectric companies buy “water flow and sediment-free waters” through payments of user fees. They play intermediary roles and provide ancillary services, such as fund management services.
5. In the case of transboundary waters, participation in the work of joint bodies should not be restricted to the Parties to bilateral and multilateral agreements on transboundary waters. Competent NGOs and the private sector should be encouraged to participate. Joint bodies thus become a platform for dialogue and joint action to ensure the protection and restoration of ecosystems and can better serve as a forum for the exchange of information on existing and planned uses of water and related installations that are likely to cause transboundary impacts, as is stipulated in the Water Convention.

C. Types of PES and financial arrangements

PES schemes have emerged in a multitude of forms related to the contractual arrangements, the methods of charging and payment, and the participation of contracting parties, namely the buyers and sellers of ecosystem services. The general classification of PES distinguishes the following major types of PES schemes: public schemes, private (self-organized) schemes and trading schemes. (See annex IV for a more detailed description of types of PES and financial arrangements and annex V for examples of PES.)

Public schemes are schemes in which a municipality or a local or national government acts as the sole or primary purchaser of a specified ecosystem service or, more commonly, a related land use or management practice. Public schemes may operate at the local or national level. In private (self-organized) schemes, both buyers and sellers are private entities (companies, NGOs, farmers' associations or cooperatives, private individuals). Private self-organized schemes are typically local schemes. Trading schemes refer to the establishment of markets in which established rights (or permits) and/or quotas can be exchanged, sold or leased. The existence of a strong, well-defined and functioning legal and regulatory framework is a prerequisite for trading schemes to operate.

Public and private PES schemes may adopt different financial arrangements regarding the compensation to sellers and the collection of buyers' contributions. The six most common financial arrangements include (for sellers) direct compensation, investment or development funds, and land purchasing and (for buyers) customer-charged payments, lump-sum contributions and tax-based contributions (for details see annex IV).

To facilitate the establishment and implementation of PES schemes and in making financial arrangements for PES, it is recommended that:

1. Governments should develop explicit policies and strategies for the development and implementation of PES schemes in their diverse forms in the water, environment/nature, agriculture/forestry and (public) utilities sectors. These policies and strategies should also refer to the establishment of PES and other measures to improve ecosystem services under existing and future river basin management plans and IWRM plans (whether transboundary or not), wetland management plans and national forest programmes.
2. Governments should facilitate PES by issuing guidelines relating to the content and registration of PES contracts and entities that manage PES. PES should be considered an incentive for transboundary cooperation and a means for implementation of transboundary agreements; joint bodies could act as the entities that manage PES in a transboundary context.
3. To facilitate the participation of public utilities in PES schemes, Governments should issue specific policies, strategies and guidelines governing their public utilities' participation in PES schemes as potential buyers of ecosystem services.
4. Governments should encourage the establishment of private schemes by acting, where possible, as facilitators and mediators between potential buyers and sellers in the establishment of private PES.
5. To attract the participation of (public) utilities and private industry, Governments could provide tax incentives (or exemptions) for financial contributions by these utilities and industries to PES schemes.
6. The type of financial arrangement should be clearly stipulated in PES contracts. In the case of direct compensation to sellers, the PES contract should stipulate (a) the land use,

management practice or service that is paid for by the PES; and (b) the established rates for that specified land use, management practice or service.

7. Governments should issue norms for minimum finance standards and practices which PES should fulfil (e.g. balance of income and expenditure accounts, the maximum percentage of income that transaction costs may constitute).

8. Governments should make sure that the above guidance does not impose detailed or specific restrictions on the contents of PES schemes and contracts that may unnecessarily restrict or scare off potential buyers and sellers contemplating entering into PES arrangements.

D. Legal and institutional frameworks

To facilitate the establishment of PES, legally binding environmental standards, judicial and compliance review mechanisms, enforcement procedures and appropriate institutional frameworks should be provided. This is without prejudice to the use of existing or future informal arrangements.

1. For the establishment and operation of PES, Governments should establish appropriate legal frameworks at the national, transboundary and international levels. Appropriate institutional arrangements at the national and local levels as well as joint bodies, such as international river and lake commissions, at the transboundary level should support these legal frameworks.

2. Provisions for the protection, restoration and sustainable use of water-related ecosystems should be incorporated into national laws and regulations, transboundary water agreements and international environmental agreements.

3. Legislation should recognize the role of water-related ecosystems in water management, taking into account the fact that water-related ecosystems are both water users and genuine suppliers of ecosystem services.

4. Legislation should be drawn up and applied to reduce fragmentation between, and improve coordination among, government departments and institutions. This requires a clear definition of the shared responsibilities of institutions responsible for, *inter alia*, planning, water, environment, nature conservation, agriculture, forestry, economy and finance.

5. Legislation should ensure access to information and a participatory approach for the involvement of all stakeholders in decision-making.

6. Sectoral rules and regulations should be harmonized in order to reduce conflicts of objectives and counterproductive incentives. Rules and regulations that subsidize overuse of natural resources and decline of ecosystem health should be repealed.

7. Rules and regulations should ensure individual and communal property/usufruct rights/permits for groundwater, surface water and land. Supportive legislative action should cover formalization and registration of rights, land use registers, coordination among departments in allocating rights, and dispute resolution mechanisms.
8. Governments should review and (where required) amend their legislation to ensure that there are no obstacles to the establishment of PES in all their diverse forms and scopes. Existing rules and regulations that may restrict the participation of public utilities in PES schemes should also be amended.
9. Public law, contract and corporate law, and procedural law should all provide a clear framework for the establishment and enforcement of PES. Governments should issue guidance on the legal requirements which PES contracts have to meet in order to conform fully with the country's corporate and contract law.
10. Governments should issue guidance regarding under which law a PES management entity should most suitably be registered in order to be recognized as a corporate entity that can issue and administer the PES contract; the legal/institutional form(s) the entity may take; and the requirements it has to fulfil under the law.
11. Governments should encourage the establishment of private schemes by ensuring that no legal obstacles deter private entities from entering into contractual arrangements to sell or buy ecosystems services or their derived land uses and management practices.
12. When embarking on or promoting trading schemes, Governments should ensure that the preconditions for the legal and regulatory framework – that is (a) clearly defined quotas and rights/permits and (b) and their economic transfer – are met in their legislation as well as in their natural resources management environment. To safeguard the principle of social equity, Governments may set specific regulatory limits and caps on trading.
13. All legal agreements implementing PES schemes between public or private entities that are not governed by international law should be subject to the national public and/or contract law of at least one of the parties. Accordingly, any dispute arising in connection with the interpretation or application of such agreements may be submitted to a domestic competent court. Therefore, PES administrators should have legal personality in order to have *locus standi* before domestic courts or arbitral tribunals.¹⁰ When such legal arrangements are entered into by parties from different countries, consideration should be given to the possibility of submitting disputes to arbitration under the 2001 Permanent Court of Arbitration Optional Rules for Arbitration of Disputes Relating to Natural Resources and/or the Environment. State Parties should ensure the enforcement of awards rendered under such rules.

¹⁰ *Locus standi* means that a given subject has the legal capacity (a) to bring a case before a court as a plaintiff or claimant, and (b) to be brought before a court as a defendant.

VI. ACCOMPANYING MEASURES

A. Information needs analysis and monitoring

Developing and implementing a PES scheme tailored to the specific basin or sub-basin under consideration and evaluating its socio-economic impact principally requires two sets of information.

One set of information is related to the functioning of ecosystems and ecosystem services, depending on land use or management practice (see section A of Chapter IV). Under the Water Convention, numerous guidelines¹¹ have already been developed which help in setting up such monitoring systems, based on a thorough analysis of information needs, taking into account stepwise approaches if money is scarce.

The other set of information is related to the design, operation and supervision of PES schemes; the effectiveness of the ecosystem service(s) provision of the PES (the ecosystem impact); and the economic efficiency and social equity (the socio-economic impact). Such information is essentially needed to facilitate compliance by sellers with the agreed service provision or land use practice. Monitoring has proven to be one of the most critical aspects of PES schemes, yet it is often very limited or even absent. Monitoring of and by PES schemes also tends to be severely restricted due to cost considerations, as monitoring costs increase transaction costs, which, when high, can easily undermine the economic viability of the PES scheme itself.

For the purpose of PES schemes, it is particularly recommended that:

1. The monitoring of ecosystem services (e.g. the effectiveness of the agreed land use/management practices in delivering improved ecosystem services) should be recognized as one of the most critical aspects of establishing and operating PES. It is needed to ensure the sustainability of PES, since in the long term buyers may not be willing to pay for a service that has not been measured or proven to exist.
2. Monitoring of the compliance of sellers with the agreed terms of the PES contract should be considered a minimum requirement and a prerequisite for PES schemes.
3. The establishment of monitoring systems for ecosystem services should follow the approaches set out in the “Strategies for Monitoring and Assessment of Transboundary Rivers, Lakes and Groundwaters”, including an information needs analysis, developing an information strategy, monitoring and data collection, data management and assessment, and reporting and information utilization.¹² These steps may be adapted, as appropriate, to the specificity of

¹¹ See, for example, the UNECE Guidelines on Monitoring and Assessment of Transboundary Rivers (and respectively Groundwaters and Lakes), available at <http://www.unece.org/env/water/publications/documents/guidelinestransrivers2000.pdf>; <http://www.unece.org/env/water/publications/documents/guidelinesgroundwater.pdf>; and <http://www.unece.org/env/water/publications/documents/lakesstrategydoc.pdf>.

¹² These “strategies were endorsed in principle by the Working Group on Monitoring and Assessment at its seventh meeting in May 2006 (ECE/MP.WAT/WG.2/2006/3 available at

monitoring ecosystem services, particularly regarding the involvement of the appropriate institutions and people, the securing of long-term funding and the use of stepwise approaches, if resources are scarce.

4. Surveys can give preliminary insight into the functioning of the water-related ecosystem. The use of low-cost monitoring techniques and of bio-indicators should also be considered. Local knowledge of the river basin may help in selecting alternative techniques. In the end, monitoring of biophysical relationships and ecosystem services may require remote sensing, modelling and other decision-support systems.

5. Establishing participatory monitoring and evaluation systems with service providers and buyers may be cost-effective alternatives worth exploring and supporting for (small-scale) local PES schemes.

6. Information needs for the design and establishment of PES schemes should be carefully identified and specified for the selected PES scheme. To specify information needs, the information users and the information producers should interact closely. This information needs analysis should lead to clear requirements to monitor/gather information on the economic and social impacts, including poverty impacts, of PES schemes. Information needed on socio-economic aspects includes not only income data but also data related to equity, poverty, livelihoods, conflicts, land tenure and land markets, and local economies.

7. Any information needs analysis should be made, and the resulting monitoring/data-gathering systems should be developed, in partnership with institutions that will use the monitoring results for PES management.

8. The exchange of data and information among upstream and downstream populations, national institutions and other sectors, also in a transboundary context, is crucial and should be free of charge. Reasonable charges for collecting and, where appropriate, processing data or information may be made if the data/information is not readily available.

9. Mechanisms such as clearing houses are to be set up to provide local managers with appropriate information on the protection, restoration and sustainable use of water-related ecosystems.

B. Awareness raising, communication and strengthening of capacities

Policies, strategies and action are shaped through an informed exchange among all stakeholders on the ecosystem approach as a development opportunity and on the benefits that water-related ecosystems can provide to upstream and downstream populations.

To convert the principles of the ecosystem approach into policies, strategies and action, and to set up and implement PES schemes, awareness-raising, better communication and capacity-

building are needed. For example, suppliers need to know the value of their ecosystem services and how much buyers are willing to pay for them. Potential beneficiaries need to know the value of these services and the conditions for continued provision. Environmental education and training programmes can be helpful in building capacity and stimulating public demand for action.

Increasing awareness and understanding of the linkages between ecosystems and the services they can often provide at a lower cost than infrastructure development is important for society at large, for policy makers and for the potential beneficiaries. Taxpayers and water users will be more willing to pay if they know what the payment is intended for and how much they will benefit from ecosystem protection. Greater awareness and understanding are also essential for establishing trust as one of the premises underlying PES schemes.

It is therefore recommended that:

1. Governments should ensure capacity-building with regard to PES in the relevant institutions, in particular local institutions, and joint bodies. Training programmes on the protection, restoration and sustainable use of water-related ecosystems are also needed as part of local and national action programmes.
2. The results of the valuation studies and the economic analysis of water-related ecosystem services should be disseminated as widely as possible in order to raise awareness of alternative and innovative ways of water management. This includes measures to attract the media for information dissemination.
3. Decision-making involves public participation. This requires that the public be informed about environmental matters, including the protection, restoration and sustainable use of water-related ecosystems.
4. Information should be directed at all levels of society and not merely at those who are already aware of the situation, as is often the case. In particular, efforts should be made to address the younger generation, who are the decision makers of the future.
5. Water engineering, water management and economic curricula should be broadened to develop awareness and skills regarding the protection and sustainable use of ecosystems, including innovative financing mechanisms, and specifically PES.
6. Governments at the appropriate levels should promote initiatives, such as pilot projects, to increase awareness among children from all types of schools regarding water-related problems and ecosystem services. This could include partnerships between “upstream” and “downstream” schools to work on water-related ecological problems.
7. Governments at the appropriate levels should also encourage and support NGOs, associations and other groups in efforts to set up or contribute to the setting up of clearing houses, the organization of “green schools”, the holding of thematic competitions, contributions to dedicated websites and other innovative ways to promote a basic understanding of integrated

water resources management, the benefits of wetlands and forests for upstream and downstream populations, the protection, restoration and sustainable use of these ecosystems, and the benefits of establishing PES.

8. Governments should draw on the expertise of international organizations in developing the capacity required to design and implement PES.

C. Research needs

Governments, including the Parties to transboundary water agreements, should intensify and promote scientific research carried out by public and private research institutions regarding the biophysical relationships in river basins, the valuation of ecosystem services and the establishment and operation of PES. Pilot projects should also be initiated. This requires allocation of sufficient funds.

It is therefore recommended that:

1. To better understand the roles and functions of water-related ecosystems and their ability to provide a specific service, research is needed on the relationship between vegetation, soil types, geomorphology, landscapes, land use and management practices.
2. With respect to flood protection services from forest ecosystems and the influence of other ecosystems in the basin, research and pilot projects should be promoted to simulate the effects of land use changes on medium-sized basins (of approximately 500 to 1,500 km²). The time-dependent flood protection services of forests and effects of other ecosystems can be quantified with an interlocking system of hydrological, hydraulic and economic computer simulation models.
3. Research is also needed on the role and functions of groundwater-dependent ecosystems, such as wetlands, particularly in relation to groundwater recharge, water purification and the ability of these ecosystems to temporarily store water.
4. Research and pilot studies to estimate the economic values of water-related ecosystem services should be promoted in order to make stakeholders and political actors aware of these values and thus improve the quality of political decision-making. Research should reveal the change in economic benefits caused by a change in the ecosystem service provided, rather than the static or stock value of ecosystems as it was in the past.
5. In line with the basic conditions and core principles for PES (see section A of Chapter V), further research is also needed on the design of equitable PES schemes as well as the reduction of transaction costs.
6. International organizations should play a role in bringing together and disseminating the results of research.

D. Financing

Political actors, decision makers and managers are increasingly aware of the capacity of PES schemes to mobilize local financial resources through a direct provider-user relationship, and they increasingly recognize the enormous achievement represented by putting ecosystem services at the centre of natural resource management.

In order to secure sustainable funding of PES projects, it is recommended that:

1. Parties to transboundary water agreements should urge international financial institutions and regional organizations to allow the establishment of PES schemes or to carry out pilot projects.
2. In addition to the establishment of PES schemes and pilot projects, funds obtained through GEF, the World Bank and bilateral funding agreements should be used for the protection, restoration and sustainable use of water-related ecosystems.
3. Given the private sector's important role as a potential buyer, its participation in funding public schemes should be explored, particularly in cases where a municipality or a local government decides to undertake and finance upstream activities to improve ecosystem services, such as safe drinking water or a sustainable water flow.
4. For PES schemes to be sustainable, it is important that even if donors support the setting up of the scheme, they not provide funds for its core functioning.
5. PES should be viewed as a valuable financing mechanism for implementing national sustainable development strategies and Poverty Reduction Strategy Papers and achieving the Millennium Development Goals.