9th Meeting of the Conference of the Parties to the Convention on Wetlands (Ramsar, Iran, 1971)

"Wetlands and water: supporting life, sustaining livelihoods"

Kampala, Uganda, 8-15 November 2005

Ramsar COP9 DOC. 16
Information Paper

Rationale for proposals for *A Conceptual Framework for the wise use of wetlands* and the updating of wise use and ecological character definitions (COP9 DR1 Annex A)

1. Mandate and process

1. Action 3.1.1 of the Ramsar Strategic Plan 2003-2008 requested the Scientific and Technical Review Panel (STRP) to "review the wise use concept, its applicability, and its consistency with the objectives of sustainable development".

2. A 2003-2005 global implementation target was set for STRP to spearhead the process of reviewing and updating guidance on the wise use concept, including the ecosystem approach, in particular in line with the outcomes of 2002 World Summit on Sustainable Development (WSSD).

3. The 2003-2005 Panel established an expert Working Group (Working Group 2), co-led by Randy Milton (Canada) and the IUCN – Commission on Ecosystem Management, to undertake this work.

4. In addition, Resolution VIII.7 (paragraph 15) requested the STRP to further review and, as appropriate, develop guidance and report to COP9 concerning identified gaps and disharmonies in defining and reporting the ecological character of wetlands, including, *inter alia,* harmonization of definitions and terms in the guidance on inventory, assessment, monitoring and management of the ecological character of wetlands. This task formed part of the work of STRP's Working Group 1 (inventory and assessment), co-led by Max Finlayson (Australia) and Lijuan Cui (China).

5. STRP Working Groups 1 and 2 have collaborated in the development of the analysis and recommendations in this paper, which have been prepared in particular by Randy Milton, David Pritchard, Max Finlayson, and the Ramsar Secretariat (Deputy Secretary General and the Secretary General). The work of the Working Group has been greatly assisted by the concurrent work of the Millennium Ecosystem Assessment (MA), in particular the MA's Conceptual Framework for Ecosystems and Human Well-being (Millennium Ecosystem Assessment 2003. *Ecosystems and Human Well-being: A Framework for Assessment.* Island Press, Washington, D.C.), and its definition and description of the characteristics of ecosystems and ecosystem services.

2. Conclusions of the STRP's review

6. The STRP's review recognized that the wise use of wetlands is one of the three pillars of the Ramsar Convention's Strategic Plan 2003-2008, and that wise use is firmly established in the commitments accepted by Parties under Article 3. The STRP has concluded that:

   i) the definition of "wise use" adopted by COP3 (1987) does need updating and re-defining, in particular to relate it to other now widely-used terms and definitions which have come into use – notably terms such as "sustainable development", "sustainable use", and "ecosystem approach";

   ii) the definition of "wise use" also needs to be more clearly related to, and linked with, that of "ecological character", which was subsequently developed by STRP and adopted by COP7 (1999) in Resolution VII.10;

   iii) "ecological character" and "change in ecological character" also need redefining, in the context of Article 3.2, to reflect recent thinking and descriptions of the term "ecosystem";

   iv) the original *Wise Use Guidelines* and *Additional Guidance* adopted by COP4 (Recommendation 4.10, 1990) and COP5 (Resolution 5.6, 1993) have now been largely superseded by the more detailed technical and scientific guidelines adopted by successive COPs and compiled as the "Ramsar toolkit of Wise Use Handbooks". All aspects of the COP4 guidelines are now covered by subsequently adopted guidance, but some aspects of the COP5 additional guidance are not covered, or not fully covered, in the Wise Use Handbooks. These concern Research (section II.3), Training (section II.4), and Technical Issues (section III.4) and are reproduced for information in Appendix 1 of this paper. The STRP recommends that it be requested to further review these sections of guidance and, as appropriate, to update and elaborate them for future consideration by COP. Moreover, at that point the Panel should consider whether, with any update and elaboration for COP approval of these guidance elements, COP4 Recommendation 4.10 and COP5 Resolution 5.6 should then be recommended to COP for retirement;

   v) although the Convention's guidance on wise use, compiled in Ramsar Wise Use Handbook 1 and amplified by the range of specific guidelines in the other Ramsar Handbooks, identifies a range of policy-level and on-the-ground implementation approaches, it lacks a clear overall conceptual framework to guide the delivery of these actions for wise use, and such a framework would clearly facilitate implementation of the Convention;

   vi) the terminology and approach developed by the Millennium Ecosystem Assessment (MA) for ecosystems and the MA's Conceptual Framework provide valuable insights into the critical importance of maintaining ecosystem services for human well-being and poverty reduction, and can form the basis for a conceptual framework for Ramsar wise use; and

   vii) mapping the Ramsar toolkit contents onto the MA's Conceptual Framework permits an assessment of the toolkit's coverage and gaps in coverage in relation to

intervention opportunities and topics, and indicates that for some intervention opportunities indicated by the MA Conceptual Framework (for example, between indirect drivers of change and human well-being) there are currently no Ramsar guidelines available, whilst for others the existing guidance may not be comprehensive: the need for additional Ramsar guidelines for such matters should be the subject of further review by the STRP.

7. At its 12th meeting the STRP agreed with the approach and recommendations of the Working Group (Decision STRP12-2). The Panel also agreed (Decision STRP12-3) that it should take steps to identify gaps in Ramsar guidance and find a means of repackaging some of the older guidance into current documents and retiring or withdrawing appropriate older ones, for consideration by COP10. It was also agreed to recommend that an STRP task for the next triennium should be to revisit the case studies of *The Wise Use of Wetlands* (1993) and others, review their subsequent progress, and provide updated case studies.

3. Current Ramsar Convention guidance on "wise use" and "ecological character"

8. The Convention text (Article 3.1) makes clear that the wise use provisions of the Convention apply, as far as possible, to all wetland ecosystems, both Wetlands of International Importance (Ramsar sites) and other wetlands, and that planning processes should be formulated and implemented so as to promote their conservation. "Wise use" is thus the overarching concept of the Convention and covers implementation responses both at the policy level as well as those directed towards specific wetlands and their support systems, such as river catchments.

9. The Convention text (Article 3.2) directs that each Contracting Party "shall arrange to be informed and report at the earliest possible time if the ecological character of any wetland in its territory and included in the List has changed, is changing or is likely to change."

10. Therefore, implicitly it is the maintenance of ecological character rather than change in the ecological character that is the desired objective for wetlands included in the List. This is explicitly stated in Recommendation V.2, Resolution VI.1, and the Ramsar Strategic Plan 2003-2008 (Operational Objective 11.1).

11. The 3rd Ramsar Conference of the Contracting Parties (COP3, 1987) defined the wise use of wetlands as:

> "*their sustainable utilisation for the benefit of humankind in a way compatible with the maintenance of the natural properties of the ecosystem.*"

12. Although a definition of "ecological character" was not adopted until Ramsar COP7 (1999, Resolution VII.10), it can be inferred that the "maintenance of the ecological character" is analogous to the "maintenance of natural properties" in the wise use definition. Thus, wise use should be achieved through the "maintenance of the ecological character of wetlands". It follows that the maintenance of their ecological character is the mechanism necessary for the wise use of any wetland, whether it is listed as internationally important or not.

13. The link between wise use and the maintenance of ecological character as the mechanism for its delivery was established further by COP8 Resolution VIII.8. This Resolution recognized that assessing the status and trends of wetlands, and assessing and reporting on their ecological character and change in ecological character, provided the basis for improving understanding of the state of, and pressures on, wetland ecosystems at all scales. Such understanding will inform future policy development, decision-making and priority setting under the Convention, and for management action on Ramsar sites and other wetlands.

4. Ramsar's wise use definition in relation to sustainable use, sustainable development and ecosystem approaches

14. As part of its definition of the wise use of wetlands, the COP3 also defined "sustainable utilisation" as:

> "*human use of a wetland so that it may yield the greatest continuous benefit to present generations while maintaining its potential to meet the needs and aspirations of future generations*".

15. Also in 1987, the Brundtland Commission defined "sustainable development" as:

> "*development that meets the needs of the present without compromising the ability of future generations to meet their own needs.*" (UN World Commission on Environment and Development. 1987. *Our common future.*)

16. Ramsar COP3 also recognized that both wise use policy and actions at site management levels are integral parts of sustainable development. Since the terms of the Brundtland definition and the Ramsar COP3 definition of "sustainable utilisation" are very similar, it follows that rather than equating wise use simply with sustainable utilisation (use), it is now more appropriate and relevant to define wise use in the context of sustainable development.

17. Furthermore, wise use as a sustainable development mechanism has been subsequently recognized by the Ramsar Convention in 1996 (COP6) through its adoption of the Convention's mission statement in the Strategic Plan 1997-2002, reaffirmed by the amended mission statement in the Strategic Plan 2003-2008 (COP8 Resolution VIII.25):

> "*the conservation and wise use of all wetlands through local, regional and national actions and international cooperation, as a contribution towards achieving sustainable development throughout the world.*"

18. The Convention on Biological Diversity (CBD) has described its "ecosystem approach" as that Convention's overarching approach for its implementation. CBD has described (in Decision V/6; COP5, 2000) the "ecosystem approach" (see also Appendix 2) as:

> "*a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way. Thus, the application of the ecosystem approach will help to reach a balance of the three objectives of the Convention: conservation;*

sustainable use; and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources.

*An ecosystem approach is based on the application of appropriate scientific methodologies focused on levels of biological organization, which encompass the essential structure, processes, functions and interactions among organisms and their environment. It recognizes that humans, with their cultural diversity, are an integral component of many ecosystem*s."

19. Thus the CBD's overarching "ecosystem approach" can be regarded as congruent with Ramsar's overarching concept of "wise use". In addition, the "Addis Ababa Principles and Guidelines for the sustainable use of biodiversity", adopted by the Convention on Biological Diversity in 2004 (CBD COP7 decision VI/12), focus attention on the sustainable use of components of biological diversity. These guidelines cover a similar range of implementation interventions at similar levels of detail to the original Ramsar Wise Use Guidance of COP4 and COP5. Hence the CBD's sustainable use guidelines also equate to the Ramsar 'toolkit' of guidelines for delivering wise use through maintaining the ecological character of wetlands.

20. In addition to the CBD's decription of "ecosystem approach" there are a number of other definitions and descriptions in current use (see Appendix 2). These include the definition used by the OSPAR and Helsinki Commissions (Declaration of the First Joint Ministerial Meeting of the Helsinki and OPSAR Commissions, June 2003) and the description and 11 principles applied by the US Fish and Wildlife Service.

5. Harmonizing Ramsar's wetland ecosystem terminology

21. Since its inception the Ramsar Convention has used a variety of descriptive terms concerning wetlands in its definitions and wise use guidelines, including wetland "features", "components", "attributes", "properties", "interactions", "processes", "benefits", "values", "functions", "goods", "products" and "services". As part of its work, the STRP was requested by COP8 (Resolution VIII.7) to review this usage and propose, if necessary, a more consistent and harmonized terminology to be used throughout the suite of Ramsar guidance on inventory, assessment, monitoring and management of the ecological character of wetlands.

22. The Millennium Ecosystem Assessment's (MA) 2003 report on *Ecosystems and Human Well-being* sets out the MA's conceptual framework and the approach and methodology adopted for the Assessment. The report was approved by the MA Board, whose membership includes the current Chairs of the Ramsar Convention's Standing Committee and Scientific and Technical Review Panel and the Secretary General and Deputy Secretary General, and the MA's agreed description and terminology for ecosystems has received wide end-user endorsement and recognition.

23. The MA's conceptual framework is significant for Ramsar, since the Convention's current definitions of wise use and sustainable utilization recognize peoples' utilization of wetlands (i.e., using their ecosystem services *sensu* MA) yielding benefit to current and future generations: in other words, implicitly recognizing the critical linkage between ecosystem services and human well-being - a relationship that lies at the core of the MA's process. The MA conceptual framework recognizes that the maintenance of ecological systems is

intertwined with the provision of ecosystem services, which in turn support people's livelihoods and their well-being (COP8 DOC. 16, para 19).

24. The MA describes ecosystems in terms of "ecosystem structure" supplying "ecosystem services" (see Figure 1). Ecosystem structure includes its physical, chemical and biological (habitats, species and genes) *components*, ecological *processes*, which include the interactions between the ecosystem components, and ecosystem *services*, a phrase which covers several terms in Ramsar usage such as "values", "functions", "goods", "products" and "services". Under the MA, ecosystem services are described as either: Provisioning, Regulating, Cultural, or Supporting. Ecosystem services delivered by wetlands include: provisioning services such as freshwater and food; regulating services such as flood control and carbon sequestration; cultural services such as recreation and inspiration; and supporting services such as purification of water supplies and groundwater recharge.

25. The MA ecosystems terminology provides a consistent and simple set of descriptors for ecosystems and can be applied to wetlands as much as to any other ecosystem.

26. Adoption of the MA terminology for application by the Ramsar Convention means that there will be a subsequent need to review and, as appropriate, revise the existing suite of guidance in the Ramsar 'toolkit' of Wise Use Handbooks adopted up to and including COP8, in order to make consistent the use of ecosystem terms throughout the Convention's body of adopted guidance. The Ramsar Secretariat, with the advice of the STRP, should undertake this during the process of preparing revisions to the Ramsar Wise Use Handbooks after COP9, incorporating the additional guidelines adopted by COP9.

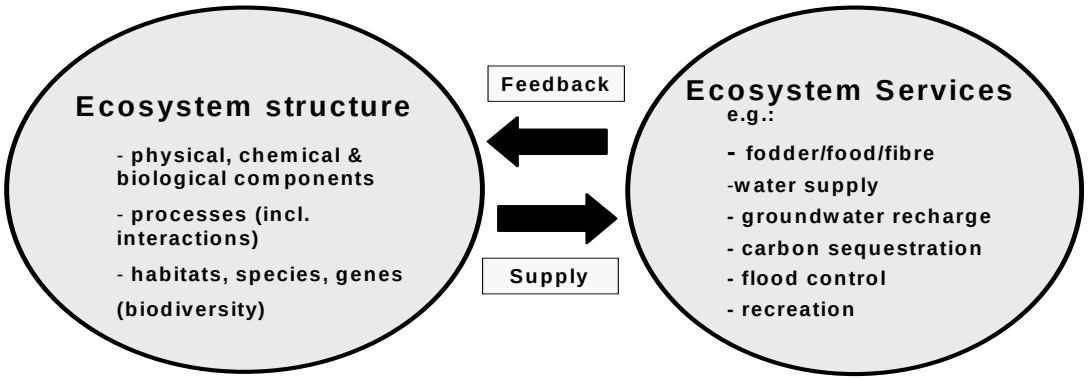

Figure 1. The Millennium Ecosystem Assessment's description of "ecosystems"

6. Updating the Ramsar definition of "ecological character" of wetlands

27. Subsequent to the Convention's adoption of the definition of "wise use", Ramsar COP7 (1999) adopted definitions of "ecological character" and "change in ecological character" of wetlands (Resolution VII.10). "Ecological character" was defined as:

> "*the sum of the biological, physical and chemical components of the wetland ecosystem, and their interactions, which maintain the wetland and its products, functions, and attributes*";

and "change in ecological character" (in relation specifically to Ramsar sites under Article 3.2 of the Convention text) was defined as:

> "*the impairment or imbalance in any biological, physical, or chemical components of the wetland ecosystem, or in their interactions, which maintain the wetland and its products, functions and attributes*."

28. Applying the MA's concepts (under which services form an integral part of ecosystems) and terms, an updated description of Ramsar "ecological character" would be:

> "***Ecological character*** *is the combination of the ecosystem components, processes and services that characterise the wetland at a given point in time*."

29. Essential to wetland management is baseline data that establishes the range of natural variation in components, processes and services at each site within a given time frame, against which change can be assessed. Contracting Parties have already adopted a range of guidance relevant to the identification, assessment, monitoring and management of the ecological character of Wetlands of International Importance and other wetlands, including wetland risk assessment (Resolution VII.10), impact assessment (Resolutions VII.16 and VIII.9), monitoring (Resolution VI.1), inventory (Resolution VIII.6), and management planning (Resolution VIII.14). The STRP is currently working on the development of a hierarchical mechanism for describing the ecological character of wetlands, and will be making recommendations for this in a COP9 Information Paper.

30. Likewise, it follows that the description of "change in ecological character" would be updated as:

> "*For the purposes of implementation of Article 3.2,* ***change in ecological character*** *is the human-induced adverse alteration of any ecosystem component, process, and/or ecosystem service*."

31. The inclusion of specific reference within the definition to Article 3.2 is intended to clarify the maintenance obligation under Article 3.2 of the Convention text, and to note that such change concerns only adverse change caused by the actions of people. This is in line with Article 3.2 of the Convention and Recommendation 4.8 (1990) establishing the Montreux Record, as re-affirmed by COP8 Resolution VIII.8. This definition for the application of Article 3.2 therefore excludes the processes of natural evolutionary change occurring in wetlands and also positive human-induced change.

32. Nevertheless, other actions adopted by the Convention, such as those concerning assessing the overall status and trends of wetlands and Ramsar sites, require information on all types of change in ecological character – positive and negative, natural and human-induced (as is recognized in COP8 DOC. 20 and Resolution VIII.8), and it may be appropriate to request the STRP to consider preparing further guidance on this matter. The Convention has also recognized that wetland restoration and/or rehabilitation programmes can lead to favourable human-induced changes in ecological character (Annex to Resolution VI.1, 1996), and are a key aspect of wetland management (e.g., Annex to

Resolution VIII.14). It follows that for these purposes change in ecological character would be more simply "*the alteration of any ecosystem component, process, and/or ecosystem service.*"

7. Updating the Ramsar definition of "wise use" of wetlands

33. Applying the MA's concepts and terminology, and taking into account the Convention's mission statement, the concepts of the ecosystem approach and sustainable use applied by the Convention on Biological Diversity, the definition of sustainable development adopted by the 1987 Brundtland Commission, and the proposed updated definition of ecological character, an updated definition of "wise use of wetlands" would be:

> "*the maintenance of their ecological character, achieved through the implementation of ecosystem approaches, within the context of sustainable development.*"

34. As noted above, the wise use provisions of the Convention apply, as far as possible, to all wetland ecosystems. However, the inclusion of the qualifier in the wise use definition of "*within the context of sustainable development, achieved through the implementation of ecosystem approaches*", recognizes that some wetland development may be inevitable and that many developments have important benefits to society. While developments can be facilitated in sustainable ways by approaches elaborated under the Convention, it is not appropriate to imply that 'development' is an objective for every wetland. Societal choice is inherent in advancing human well-being and poverty alleviation. Pressures to follow sustainable development precepts and to maintain environmental, economic and social sustainability in land use decisions encourage compromises between individual and collective interests. Within the context of ecosystem approaches, planning processes should be formulated and implemented so as to promote wetland ecosystem services and the maintenance of wetland ecological character at appropriate spatial and temporal scales.

35. Furthermore, Resolution VII.24 (1999) notes that effective wetland protection involves the conservation of wetlands as a first choice within a three-step mitigation sequence, and further requests that additional criteria and guidelines be developed for the compensation of wetland habitats in the case of unavoidable losses. As a matter of priority the STRP should be requested to develop criteria and guidelines on the appropriate mitigation sequence to support the decision planning process and the existing guidance, balancing wetland wise use and sustainable development in order to advance human well-being and poverty alleviation.

8. A conceptual framework for the "wise use of wetlands"

36. The Millennium Ecosystem Assessment (MA) Conceptual Framework describes the inter-relationships between ecosystems services and human well-being and poverty reduction, the ways in which direct and indirect drivers of change affect ecosystem services and their capacity to deliver human well-being. It shows where policy and management strategies and interventions may be made so as to secure the maintenance of ecosystem services and human well-being (Figure 2).

37. The Conceptual Framework provides a multi-scalar conceptual framework for the delivery of the wise use of wetlands under the Ramsar Convention. Under this framework, wise use equates to the delivery arrow from ecosystem services to human well-being and poverty

reduction. The framework helps to show how, and when, to apply policy and management interventions using the different guidelines adopted by the Convention and included in the Ramsar 'toolkit', so as to deliver the wise use of wetlands.

38. It should be noted that most of the current Ramsar wise use guidelines concern interventions to ecosystems and their processes, or interventions addressing aspects of the direct drivers of change to ecosystems. Also, these interventions are made chiefly at local or national scales, since Ramsar guidance is for Contracting Parties acting within their territories, although some applies regionally or globally (e.g., aspects of the *Guidelines for International Cooperation*).

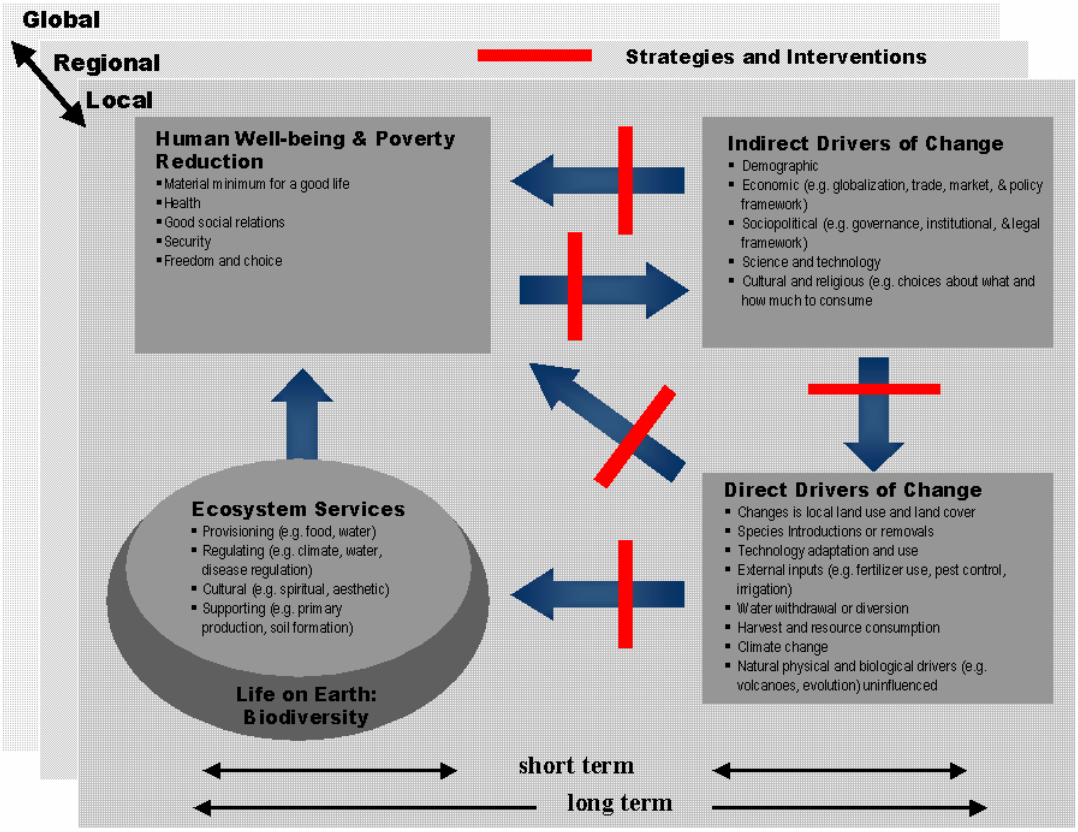

Figure 2. The Millennium Ecosystem Assessment's (MA) Conceptual Framework. [from: Millennium Ecosystem Assessment. 2003. *Ecosystems and Human Well-being. A Framework for Assessment.* Island Press, Washington, D.C..]

39. Only two Ramsar guidelines – National Wetland Policies and Reviewing Legislative and Institutional Frameworks – wholly concern interventions to indirect drivers of change, although some others include some policy aspects. However, it is clear that these 'interventions' onto the indirect drivers of change are important to have in place if efforts to manage wetland ecosystems sustainably are to be effective and efficient. Without such a policy and legislative framework in place, there is a risk that other interventions will take place in a vacuum, without a clear authorizing environment for their delivery, thus risking such efforts failing.

40. Furthermore, for some intervention opportunities indicated by the MA Conceptual Framework – for example, between indirect drivers of change and human well-being and *vice versa* – there are currently no Ramsar guidelines developed. The need for, and relevance of, further such guidance should be reviewed by the STRP in the 2005-2008 triennium.

Appendix 1

Aspects of Ramsar's COP5 *Additional guidance for the implementation of the wise use concept* (Resolution 5.6) not covered by subsequently adopted Ramsar guidelines

II.3 Research

Research can be anything that expands upon basic knowledge. Particular areas that may deserve attention are both identification and quantification of wetland values, sustainability of wetland use, and landscape functioning and modification. Contracting Parties should take positive steps to acquire and, when possible, share any knowledge developed on wetland values, functions and uses.

1) Priority research actions may include:

- The development of a vocabulary of terms, understandable world-wide;
- The development of means to emphasize landscape or catchment approaches in management;
- The development of techniques for monitoring ecological change and forecasting the evolution of wetland characteristics under the pressure of present uses;
- The improvement of the knowledge base of wetland functions and values, especially the socio-economic values of wetlands, in order to learn about the traditional management techniques of the local populations and their needs;
- The improvement of the knowledge of the scientific classification of wetlands micro-organisms, plants and animals, and the lodging of study specimens with museums or other appropriate institutions;
- The development of methodologies to evaluate sustainable practices;
- The provision of the data on which alternative/wise use technologies can be developed;
- The development of techniques for restoration of wetlands.

2) The above-mentioned research questions represent an indication of needs. In practice, it can be expected that the number of specific research questions to be addressed will increase as progress is made in natural resource programmes. Research priorities must be based on management needs.

II.4 Training

1) Attention should be devoted to four aspects of training:

- *The definition of training needs*
- *The differing needs between regions, countries and sites*
  Expertise may not always be available and some key aspects of wise use may not be covered in the existing programme. These key aspects must be considered as priorities for further training activities. Therefore, the first step in establishing a training programme should be to carry out a training needs analysis.

- *The target audience*
  There is a huge difference between educational and awareness programmes and professional training. Generally, it can be said that while the general public and senior policy makers should be made aware of ecological, cultural, social and economical values of wetland ecosystems, training should be provided for those who are directly involved in administering and practising wetland management. Training sessions should focus on the most up-to-date methods for implementing wise use. Such sessions need also to be organized for judicial authorities and other law enforcement officials.
- *The subject*
  Training should furnish wetland managers and administrators with the professional knowledge needed for establishing, defending, and implementing the concept of wise use of wetlands.

2) Three broad types of training appear to be of particular relevance for wetland professionals:

- *Courses on integrated management*
  Training should seek to bring together specialists from different fields to generate a common understanding and a common approach to wetland management and planning;
- *Courses on wetland management techniques*
  Training should seek to provide the participants with the most up-to-date and effective techniques of inventory, planning, monitoring, environmental impact assessment (EIA) and restoration;
- *Courses for field staff*
  Wardens and rangers need to have a very basic understanding of the concept of wise use and to be able to deal with day-to-day situations such as enforcement of legislation and public awareness.

The development of training manuals and other resource materials should be an important long-term goal for any training programme.

3) Training methods and resources

Training activities and transfer of appropriate knowledge should be an integrated component of all wise use projects. Those activities should be as catalytic as possible, and seek to train potential trainers at regional level who can then pass on their expertise to lower levels, and involve the cooperation of governmental and non-governmental organizations, using local resources and institutions whenever possible.

III.4 Technical issues

For many regions of the world, wise use is not a new concept. Humans have been building civilizations around wetlands for thousands of years, and have developed technologies of utilization.

Many of these technologies are sustainable, and should therefore be identified, studied and promoted as a matter of urgency. In the cases where these technologies are not sustainable, they should be refined and adapted to optimize their sustainability.

Appendix 2

Some current descriptions and definitions of "ecosystem approach"

Convention on Biological Diversity (CBD)

1. The ecosystem approach is a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way. Thus, the application of the ecosystem approach will help to reach a balance of the three objectives of the Convention: conservation, sustainable use, and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources.

2. An ecosystem approach is based on the application of appropriate scientific methodologies focused on levels of biological organization, which encompass the essential structure, processes, functions and interactions among organisms and their environment. It recognizes that humans, with their cultural diversity, are an integral component of many ecosystems.

3. This focus on structure, processes, functions and interactions is consistent with the definition of "ecosystem" provided in Article 2 of the Convention on Biological Diversity: "'Ecosystem' means a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit." This definition does not specify any particular spatial unit or scale, in contrast to the Convention definition of "habitat". Thus, the term "ecosystem" does not, necessarily, correspond to the terms "biome" or "ecological zone", but can refer to any functioning unit at any scale. Indeed, the scale of analysis and action should be determined by the problem being addressed. It could, for example, be a grain of soil, a pond, a forest, a biome or the entire biosphere.

   The 12 guiding principles for CBD's ecosystem approach:

   1. The objectives of management of land, water and living resources are a matter of societal choice.

   2. Management should be decentralized to the lowest appropriate level.

   3. Ecosystem managers should consider the effects (actual or potential) of their activities on adjacent and other ecosystems.

   4. Recognizing potential gains from management, there is usually a need to understand and manage the ecosystem in an economic context.

   5. Conservation of ecosystem structure and functioning, in order to maintain ecosystem services, should be a priority target of the ecosystem approach.

   6. Ecosystems must be managed within the limits of their functioning.

   7. The ecosystem approach should be undertaken at the appropriate spatial and temporal scales.

8. Recognizing the varying temporal scales and lag-effects that characterize ecosystem processes, objectives for ecosystem management should be set for the long term.

9. Management must recognize that change is inevitable.

10. The ecosystem approach should seek the appropriate balance between, and integration of, conservation and use of biological diversity.

11. The ecosystem approach should consider all forms of relevant information, including scientific and indigenous and local knowledge, innovations and practices.

12. The ecosystem approach should involve all relevant sectors of society and scientific disciplines.

(CBD Decision V/6, COP5, 2000)

Helsinki and OSPAR Commissions (concerning protection of the North-East Atlantic and Baltic Seas)

The ecosystem approach is commonly defined as: "the comprehensive integrated management of human activities based on the best available scientific knowledge about the ecosystem and its dynamics, in order to identify and take action on influences which are critical to the health of marine ecosystems, thereby achieving sustainable use of ecosystem goods and services and maintenance of ecosystem integrity".

Ecosystem approach is based on a multi-species framework, where emphasis is on long-term sustainability, integrating human activities and conservation of nature, including political, economic and social values, and should propose solutions which are socially acceptable. It is also important to recognise that it is human activities that we are able to manage, not ecosystems *per se*.

(Declaration of the First Joint Ministerial Meeting of the Helsinki and OSPAR Commissions, Bremen 25-26 June 2003)

UN Food and Agriculture Organisation (FAO) (concerning sustainable fisheries)

An ecosystem approach to fisheries (EAF) strives to balance diverse societal objectives, by taking account of the knowledge and uncertainties of biotic, abiotic and human components of ecosystems and their interactions and applying an integrated approach to fisheries within ecologically meaningful boundaries.

The purpose of an ecosystem approach to fisheries is to plan, develop and manage fisheries in a manner that addresses the multiple needs and desires of societies, without jeopardizing the options for future generations to benefit from the full range of goods and services provided by marine ecosystems.

Principles:

- fisheries should be managed to limit their impact on the ecosystem to the extent possible;
- ecological relationships between harvested, dependent and associated species should be maintained;
- management measures should be compatible across the entire distribution of the resource (across jurisdictions and management plans);
- the precautionary approach should be applied because the knowledge on ecosystems is incomplete; and
- governance should ensure both human and ecosystem well-being and equity.

(FAO Technical Guidelines for Responsible Fisheries: Fisheries management. 2. The ecosystem approach to fisheries. 2003.
http://www.fao.org/documents/show_cdr.asp?url_file=/DOCREP/005/Y4470E/Y4470E00.HTM)

US Fish and Wildlife Service (concerning fish and wildlife conservation)

An ecosystem approach to fish and wildlife conservation means protecting or restoring the function, structure, and species composition of an ecosystem while providing for its sustainable socioeconomic use.

Principles:

- Recognize that economic sustainability and societal well-being depend upon conservation of healthy ecosystems.
- Consider and incorporate environmental and socioeconomic factors and interests into goal-setting and implementation.
- Base decisions on the best available science and data, and ensure that information is of high quality.
- Recognize that conservation of fish and wildlife must address processes at varying scales.
- Recognize that the dynamics and resiliency of ecosystems vary.
- Stress prevention of degradation over mitigation or restoration.
- Involve all stakeholders in developing and achieving the desired conditions for the ecosystem.
- Adopt an interdisciplinary, coordinated approach; all stakeholders integrate expertise, resources, and tools to achieve results.
- Practice flexibility and innovation.
- Practice adaptive management: monitor and evaluate outcomes, and readjust management direction accordingly.
- Incorporate information from all organizational levels and sectors into decision-making processes. Delegate decisions to the lowest appropriate level, and give employees maximum possible authority.

(http://training.fws.gov/library/pubs9/habitatmgmt/adoption.html)

Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR)

Management . . . follows an 'ecosystem' approach. Ideally, this takes into account all the delicate and complex relationships between organisms (of all sizes) and physical processes (such as currents and sea temperature) that constitute the Antarctic marine ecosystem.

CCAMLR's ecosystem approach therefore not only focuses on regulating fishing for certain species, it also aims to ensure that fishing does not impact adversely on other species that are related to, or dependent on, the target species.

(http://www.ccamlr.org/pu/E/sc/eco-app-intro.htm)

IUCN/WWF (Strategic approaches to freshwater management - the ecosystem approach)

The ecosystem approach:

- is a comprehensive regional approach that integrates ecological protection and restoration with human needs to strengthen the fundamental connection between economic and social prosperity and environmental well being.

- provides a framework that draws together governments, the private sector, public groups and other stakeholders to achieve an ultimate goal of sustaining healthy ecosystems that continue to provide a multitude of goods and services to support basic human needs.

- is goal driven and is based on a collaboratively developed vision of desired future conditions that integrates ecological, economic, social and legal factors. It is applied within a geographic framework defined primarily by ecological boundaries such as catchments and groundwater system units.

The goal of the ecosystem approach is to restore and sustain the functions of ecosystems, based on their health, productivity, and biological diversity, and the overall quality of life through a natural resource management approach that is fully integrated with social and economic goals.

Taking an ecosystem approach to freshwater management means assessing water availability (quantity and quality), identifying inter-relationships at the ecosystem level, predicting the environmental and social impact of any proposed action and evaluating the consequences before any decision is made on use. An ecosystem approach to freshwater management emphasises the dependence of maximising the sustainable use on the conservation of freshwater ecosystems and focuses on catchments or groundwater systems as the appropriate units of management.

The implementation of the ecosystem approach is based on four principles: a) adapting policy and practices including the equitable sharing of costs and benefits and the implementation of sustainable practices; b) establishing new partnerships to improve effectiveness and efficiency in freshwater ecosystem management; c) strengthening the capacities at different levels to sustainably manage water resources; d) improving the assessment of water resources and ecosystem functions and identifying threats to the resource base.

(Strategic approaches to freshwater management: background paper -- the ecosystem approach. Panel discussion on "Freshwater Ecosystem Conservation: Water for People" (21 April 1998), as part of the 6th Session of the Commission on Sustainable Development, New York (http://www.ramsar.org/key_csd6_iucnwwf_bkgd.htm)

IUCN-The World Conservation Union (concerning the ecosystem approach to water management)

The ecosystem approach to water management complements the current thinking on Integrated Water Resources Management. The approach builds on the consensus that has been reached during the decade after 'Dublin' and 'Rio'. This consensus can be summarized in seven principles of modern water management:

- *Equity* - water management activities equitably distribute the costs and benefits from water resources use and management and explicitly aim to alleviate poverty and create gender balance.

- *Efficiency* - management promotes the most efficient use and reflects the full value of the resource, including market, ecosystem and socio-cultural values.

- *Sustainability* - the water management regime is self-sustaining and readily adapts to changing conditions.

- *Legitimacy* - water management institutions have a sound legal basis and their decisions and actions are seen as legitimate and fair by all stakeholders.

- *Accountability* - policies and practice, and roles and responsibilities lead to effecient, fair and legitimate uses of water resources and the diffferent stakeholders are accountable for their actions.

- *Subsidiarity* - decision-making authority is devolved to the lowest appropriate level along with the power and resources to make and implement these decisions.

- *Participatory* - all stakeholders are given the opportunity to participate in water resources planning and management decision-making and to become involved in reducing water conflicts.

(IUCN Water & Nature Initiative - http://www.waterandnature.org/pub/EcoMan.pdf)