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Item 4.2 of the provisional agenda\*

### **BIOLOGICAL DIVERSITY OF INLAND WATER ECOSYSTEMS:**

#### **FURTHER DETAILS OF THE WORK OF THE EXPERT GROUP ON MAINTAINING THE ABILITY OF BIODIVERSITY TO CONTINUE TO SUPPORT THE WATER CYCLE**

*Note by the Executive Secretary*

#### **I. INTRODUCTION**

1. In paragraph 39 of decision X/28, the Conference of the Parties recognized the good synergies between the Convention on Biological Diversity and the Ramsar Convention on Wetlands, and requested the Executive Secretary, and invited the Secretariat and Scientific and Technical Review Panel (STRP) of the Ramsar Convention, and other relevant partners, subject to the availability of financial resources, to establish an expert working group, building upon the relevant core expertise of the STRP of the Ramsar Convention, to review available information, and provide key policy relevant messages, on maintaining the ability of biodiversity to continue to support the water cycle, with the terms of reference annexed to that decision. In paragraph 40 of the same decision, the Conference of the Parties invited Parties, other Governments and relevant organizations to submit to the Executive Secretary science-based and/or local-knowledge-based information and case-studies relevant to the work of the expert group, but to also note that this work should not delay immediate action, where necessary and appropriate, at national level to address the subjects in question. In paragraph 41 of the decision, the Conference of the Parties requested the Executive Secretary to, *inter alia*, report on progress to a meeting of the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA) prior to its eleventh meeting.

2. In response to this request, the Executive Secretary provided SBSTTA with a brief progress report as document UNEP/CBD/SBSTTA/15/11 which indicated that the Executive Secretary would make further details of the progress with the work available to SBSTTA. This note serves that purpose and in particular (i) to solicit feedback from Parties, other Governments and relevant organizations; and (ii) to provide further guidance on submissions of relevant information to assist the work (as per para. 40 of decision X/28, as noted above).

\* UNEP/CBD/SBSTTA/15/1

3. Section II of this note provides an update on the progress with the work. Section III provides a more detailed annotated outline of the technical work required.

4. The Executive Secretary is inviting Parties, other Governments, relevant organizations and individuals to submit comments on the work and relevant information etc. (a notification to this effect will also be issued). The work has already started and inputs can be provided in advance of the fifteenth meeting of SBSTTA and provided as soon as possible but at any time up to early 2012. Information can be provided on any relevant topic but in particular on the following (based on the expanded outline in Section III):

(a) Details of relevant experts and centres of excellence, noting the need to ensure the capture of relevant knowledge from developing countries;

(b) Copies (or web-links) of relevant publications, preferably but not limited to those published through peer-review, in particular those that provide reviews of the topics in question;

(c) Relevant case-studies to support the topics in question, either those which illustrate the negative impacts of biodiversity (or ecosystem) degradation, but in particular examples of how sustaining or restoring biodiversity (ecosystems) has contributed to improved water security and the delivery of benefits to people; and

(d) Information on the social and economic benefits (or losses) through improved management (or degradation) of the biodiversity-water cycle relationship and in particular where quantified through rigorous economic assessment.

5. Information can be submitted to [secretariat@cbd.int](mailto:secretariat@cbd.int).

## **II. FURTHER PROGRESS WITH THE WORK**

6. As noted in the progress report on the work in addressing paragraphs 39 to 41 of decision X/28 (UNEP/CBD/SBSTTA/15/11), co-funding support to enable the work of the expert group has been generously provided by Australia, Canada, Finland, Norway and the Republic of Korea. There are sufficient resources to proceed but currently a slight shortfall which influences options later in work, particularly publication format and editing options and the size of the expert group meeting (see below).

7. Further to the initial meeting of a small group of experts of the Ramsar STRP on 2 and 3 July 2011, held back-to-back with a previously scheduled STRP member's workshop held 30 June to 2 July at the Centre for Ecology and Hydrology, in Wallingford, United Kingdom: the terms of reference for the expert group (annex to decision X/28) were assessed and formulated into manageable topics detailed further in section III.

8. It is noted that decision X/28 establishes the expert group as a process and not a one off meeting of experts. The plan is to work initially through correspondence in order to gather and assess the existing literature (etc.) as far as possible within the resources available. It is anticipated that this will be followed by a period of report drafting which will be followed by a face-to-face meeting of key experts to finalize the product, including deriving the key policy relevant messages called for.

9. The proposed scheduling of the work is to finalize the content by February 2012, followed by editing/drafting to April and finalization by June 2012. The schedule will need to be flexible and the timing of the aforementioned meeting of experts will preferably be arranged back-to-back with another meeting to make efficient use of resources (the Executive Secretary will provide further information in advance). This schedule factors into consideration: (i) the complex nature of the topic; (ii) the intention to

peer-review sections as they are produced; and (iii) a portion of the voluntary budget commitments received is available only in 2012.

10. The Executive Secretary will ensure opportunity for peer-review through SBSTTA focal points of the outputs of the group. Peer-review by the STRP is already in-built as the STRP is the lead partner for the work.

11. Work towards identifying key information, authors and contributors has already commenced (as of August 2011). Content preparation has started for wetlands because this is the core area of expertise of the STRP. As indicated in section III, inputs into relevant topics (including wetlands) are now being actively sought.

12. The “composition” of the expert group is flexible. There will be leads and a sub-team for each major section (as below). Contributors will be acknowledged in the final report. Currently (as of 11 October 2011) the only experts “in” the group are three contributors volunteering through Ramsar STRP. One important purpose of this note is to alert SBSTTA to the opportunities to expand the expertise base (as per section III). The Chairs of both SBSTTA and the STRP will jointly oversee the work.

### **III. DRAFT EXPANDED TECHNICAL OUTLINE OF THE SUBJECT AREAS TO BE COVERED**

13. The proposed work is indeed complex. The nature of the water cycle inevitably means that most things are interconnected. Five key “sub-parts” of the water cycle (in terms of how it is influenced by biodiversity) can be identified: wetlands, forests, grasslands, crops (agriculture) and soils. Soils are important but problematic in terms of where the topic “fits” as soils are relevant to all of the aforementioned biomes/sectors. Currently soils are grouped under agriculture/crops because that is where much expertise exists but will be covered in other topics also. These groupings are influenced largely by perceived expertise availability. They are thought to be the best approach to accessing information. But they are not necessarily the best way to present the topic in the final output (for example, forests, grasslands and crops are all technically the same subject – land cover).

14. There will be considerable difficulties in focusing the scope of the work within practical limits because many things can be justifiably linked to the topic including practically any subject related to water. Focus needs to centre on the role of biodiversity in supporting the water cycle (as per the mandate given). The work includes (as per the terms of reference) the impacts of water use, in particular groundwater depletion, on biodiversity and this is deemed particularly relevant where this further exacerbates water availability through cyclic interactions. The term “biodiversity” will be used in its broadest sense, as per both Ramsar and CBD approaches, and in particular noting that this includes at the ecosystem level. This means that ecosystem influences on hydrology (e.g., wetlands regulating water flows) are included irrespective of whether influences occur at the species, community level or habitat structure level. This is consistent with the focus on ecosystem services.

15. The topic primarily includes the water cycle as it relates, obviously, to water availability (quantity). Water quality is a related issue in that it is influenced by water quantity and is an important ecosystem service in itself. Water quality issues are therefore included with particular attention to the role of biodiversity (ecosystems) in underpinning water quality as a service. The broader subject of water quality, beyond the role of biodiversity in underpinning it, for example sources and trends in pollution etc., is not a priority work area as this topic has already and recently been well reviewed.

16. There is an initial and central need to adequately cover what might be termed “eco-hydrology” which is essentially to establish the hydrological science underpinning the biodiversity-water cycle relationship (or as might sometimes be the case, the absence of science in this regard). This is reflected in topic 2 in the outline below. This knowledge then needs to be linked through to social and economic dimensions

and management and policy (including financing). It is essential that the work captures the social and economic importance of this topic. This is covered in topic 4. Topic 3 is a blend of the two specifically focusing on cities.

17. The work has already identified that there are terminology issues. Language such as “biodiversity” may not be well understood even by some relevant expert forums. The associated terms “ecosystems” and “natural infrastructure” are considered, in practice, to be synonymous and should be used depending on the audience.

18. The proposed technical outline of the topics of the work is as per the table below. This is flexible and comments for improvements, and in particular gaps, are welcome. At this stage it is probably not productive to dwell on details of structure as this will be addressed through a future group editing process.

Topic	Notes
<b>Key policy messages</b>	To be derived later from the sections below
<p><b>1. Introduction (to be completed later)</b></p>	
<p>To include: stage setting – trends in water security and ecosystem services; introduction to natural infrastructure and explanation of the role of biodiversity in the water cycle (hydrology).</p>	
<p><b>2. Key components of inter-connected water cycles</b></p>	
<p>This topic explores in more detail each of the main parts of the water cycle which are underpinned by biodiversity/ecosystems (natural infrastructure) – although noting that all parts of the cycle are interconnected (and there are “sub-cycles” at different scales). The topic looks primarily at ecology-hydrology relationships but includes an introduction to the implications of these for socio-economic considerations.</p>	
<p>It will include an assessment of the status of science on the topic, including confidence levels for conclusions drawn. Conflicting evidence will be included as will gaps in information.</p>	
<p><b>2.1 Wetlands</b></p> <p>2.1.1 Definition Broadly defined as per Ramsar definition (i.e. including all surface water bodies including rivers, lakes, floodplains, swamps, marshes etc.) Ramsar, wide diversity of wetland types</p> <p>2.1.2 Extent Global extent, regional local importance</p> <p>2.1.3 Hydrological processes Rainfall, evaporation, flow regulation, groundwater exchange, influences on water quality</p> <p>2.1.4 Evidence for hydrological functions Flood regulation, groundwater recharge, water quality (with case study examples) [Possible case-studies: evaporation and climate recycle, Inner Niger delta, Sudd, Las Tablas de Damiel; + more]</p> <p>2.1.5 Economic values of water-related wetlands</p>	<p>This topic will draw heavily on the expertise, and good existing information, available through the STRP. [Additional inputs are welcome].</p> <p>The topic essentially deals with all surface waters and saturated surface soils (e.g. peatlands).</p>

Topic	Notes
<p>services</p> <p>2.1.6 Related issues</p> <p>Carbon and water cycle interactions</p> <p>2.1.7 Global and regional policies</p> <p>Ramsar, EU WFD, US wetland policies, South Africa</p> <p>2.1.8 Management options</p> <p>2.1.9 Policy recommendations<sup>1</sup></p>	
<p><b>2.2 Forests</b></p> <p>2.2.1 Scope</p> <p>Tropical, temperate, boreal types</p> <p>2.2.2 Extent</p> <p>Global extent, regional local importance</p> <p>2.2.3 Hydrological processes</p> <p>Rainfall, evaporation, interception, flow through, soil moisture, specialization e.g. tropical forests need to shed water so have waxy leaves pointed. Groundwater dependency.</p> <p>2.2.4 Evidence for hydrological functions</p> <p>Flood regulation, infiltration, water recycling (cloud forests)</p> <p>Groundwater impacts</p> <p>[Case-studies: Amazon, boreal forests, recent UK woodlands study, + more].</p> <p>2.2.5 Related issues</p> <p>Carbon and water cycle interactions</p> <p>2.2.6 Economic values of water-related forest ecosystem services</p> <p>2.2.7 Global and regional policies</p> <p>Inc. CBD and REDD+</p> <p>2.2.8 Management options</p> <p>2.2.9 Policy recommendations</p>	<p>Forests are an important area where the expert group requires specialized inputs beyond current expertise through the STRP. Topics include but are not limited to the following:</p> <p>(i) the role that forests play in local and regional water cycles. Such roles are diverse. There is clear evidence of important linkages through evapo-transpiration and local/regional climate patterns (consolidated information is required);</p> <p>(ii) the extent to which forests regulate surface water flows, including the extremes of drought and flooding (some science on the latter is conflicting);</p> <p>(iii) better information is required on the relationships between the carbon cycle (carbon storage) and water cycles (especially evapo-transpiration/ precipitation and groundwater depletion impacts on forest carbon);</p> <p>(iv) the contribution of forests to regulating water quality is reasonably well documented – but is this role specific to forests? (or is it an attribute of adequate land cover of any form?);</p> <p>(v) the extent to which different forest types (particularly natural <i>versus</i> managed) differ in terms of impacts on hydrology.</p>
<p><b>2.3 Grasslands</b></p>	<p>Grasslands are an important biome world-wide</p>

<sup>1</sup> "Recommendations" here refers to those identified by the expert group. SBSTTA and CBD COP and STRP and Ramsar COP shall of course decide the appropriate action each body will take in response to the work of the group.

Topic	Notes
<p>2.3.1 Definition Savannah, temperate</p> <p>2.3.2 Extent Global extent, regional local importance</p> <p>2.3.3 Hydrological processes Rainfall, evaporation, soil moisture</p> <p>2.3.4 Evidence for hydrological functions Infiltration, water retention (transpiration?)</p> <p>2.3.4 Related issues Grazing pressure, desertification, any carbon links?</p> <p>2.3.5 Economic values of water-related grasslands services</p> <p>2.3.6 Global and regional policies UNCCD</p> <p>2.3.7 Management options Grazing pressures</p> <p>2.3.8 Policy recommendations</p>	<p>and specific attention to them is therefore appropriate.</p> <p>Topics may be as per forests above. Do grasslands function the same way as forests?</p> <p>“Grazing pressure” (or other unsustainable use) is thought to be a key related issue (similar to “deforestation” as per forest issues). This topic is relevant where "grazing" degrades grasslands and in turn influences the ability of grassland ecosystems to sustain water cycling.</p> <p>Carbon storage? (in relation to links with water cycling). (Soil carbon in grasslands overlaps with soil carbon in section 2.4 below).</p>
<p><b>2.4 Arable land, agriculture and soils</b></p> <p>2.4.1 Definition Tropical, arid and semi-arid, temperate agricultural systems</p> <p>2.4.2 Extent Global extent, regional local importance</p> <p>2.4.3 Hydrological processes Land-cover change impacts on evaporation/transpiration and water requirements Soil functions</p> <p>2.4.4 Evidence for hydrological functions Land cover (change, natural versus crops), soil functions, infiltration, transpiration</p> <p>2.4.5 Related issues Soil erosion, sediment transfer (also relates to forests/grasslands) Carbon and water cycle linkages (especially in soils)</p> <p>2.4.6 Food security (re. water security) The dependency of food security on water security</p>	<p>This section focuses on (i) land use (land cover) change brought about by agriculture; and (ii) relevant aspects of soil functionality and soil moisture – both with regards to impacts on hydrology.</p> <p>This is a key area due to (i) being the major driver of land cover change; and (ii) links with food security (which are assumed to be generally reinforcing in that food requires water for its production and therefore restoring soil functions re. water is compatible with food security objectives); (iii) carbon storage in agricultural lands (re. impacts of water on).</p> <p>The work will focus on linkages between biodiversity, water cycling and agriculture – that is how better biodiversity (ecosystem) management can contribute to more sustainable agriculture. “Water use” by agriculture (meaning surface waters, e.g. irrigation, is not an unrelated issue but already well covered in the literature).</p> <p>Considerable information is already available</p>

Topic	Notes
<p>The role of ecosystems in underpinning water for food security</p> <p>2.4.7 Economic values of agricultural ecosystem services including for soils (i.e., those dependent on water cycling – which is all of them)</p> <p>2.4.8 Global and regional policies More crop per drop, Challenge Programme on Water and Food etc.</p> <p>2.4.9 Management options Conservative agriculture, organic farming (?), terracing, rainwater harvesting, reduced transpiration (locality appropriate crops)</p> <p>2.4.10 Policy recommendations</p>	<p>through, <i>inter alia</i>, the extensive work of the Comprehensive Assessment of Water Management in Agriculture, and the FAO and others. Although this needs consolidating and possibly updating.</p> <p>Linkages between agricultural systems and other biomes (e.g., forest-agriculture and wetland-agriculture water supply relationships) need to be included.</p>
<p><b>3. Biodiversity, water security and cities</b> The issues regarding biodiversity-water and cities are not necessarily different to those intended to be captured in topic 2. But the importance of cities, urbanization and related human development issues warrants a special focus on this topic. Water security is certainly a key challenge faced by most cities.</p>	
<p>3.1 Trends in urbanisation</p> <p>3.2 Cities and water security</p> <p>3.3 The role of ecosystems in water supply for cities (water quality, water quantity including extremes of drought/flood)</p> <p>    3.3.1 within cities</p> <p>    3.3.2 in catchment</p> <p>3.4 Evidence of linkages and hydrological functions</p> <p>3.5 Related issues Impacts of cities on water cycle (including land use change). Conflict between water supply for urban areas and food production in catchment.</p> <p>3.6 Values of water-related ecosystem services to cities</p> <p>3.7 Global and regional policies</p> <p>3.8 Management options</p> <p>3.9 Cities as a source of political will and sustainable financing</p> <p>3.10 Management options</p>	<p>The section will draw on available information on: (i) trends in water security in cities; (ii) scenarios; (iii) current reliance of cities on ecosystems (e.g. protected catchments); (iv) cities as sources of financing and political will.</p> <p>The section will cover: (i) ecosystems as suppliers of water beyond the boundaries of cities (catchment scale); and (ii) ecosystem functions (or lack thereof) within the boundaries of cities (e.g., sealed surface <i>versus</i> porous vegetated areas etc., including recharging groundwater and flood management).</p> <p>The section will cover: (i) water quality demands; and (ii) regulation of extreme events, especially flood risk (and drought, which may prove a more problematic area to assess).</p> <p>The role of biodiversity/ecosystems in coping with the water footprint of cities (including nutrient recycling), largely concerning downstream impacts of cities, will be included as far as feasible.</p>
<p><b>4. RESPONSES: UP-SCALING NATURAL INFRASTRUCTURE SOLUTIONS</b></p>	

Topic	Notes
<p>This topic builds on earlier sections and focuses on a more detailed assessment of what needs to be done and how.</p>	
<p><b>4.1 Water management options</b></p> <p>4.1.1 Existing approach  Built infrastructure, advantages and drawbacks  Role of dams and other infrastructure, such as roads  Contrast developed and developing world  Examples of problems/high costs of built infrastructure  (are poor countries better advised to look to natural infrastructure?)</p> <p>4.1.2 Conceptual approach to natural infrastructure  Water management as a legitimate land management option, not just an add-on  Good examples of natural infrastructure solutions  Practical actions e.g. afforesting hillsides, rainfall harvesting  Limitations of natural infrastructure  Availability of data and best practice on natural systems to make rapid decisions</p> <p>4.1.3 Economic aspects</p> <p>4.1.4 Options assessment  Need for full-cycle analysis  Balancing built and natural infrastructure  Timing of investments</p>	
<p><b>4.2 Land management options</b></p> <p>4.1.1 Existing approach</p> <p>4.1.2 Conceptual approach to natural infrastructure</p> <p>4.1.3 Economic aspects</p> <p>4.1.4 Options assessment</p>	
<p><b>4.3 Institutional structures and governance</b></p> <p>4.3.1 Current approach  Planning cycles, institutions, power balance  Historical legacy of built infrastructure as the best solution  Corruption</p> <p>4.3.2 Challenges of integrated approaches  Ecosystems not considered as part of water planning solutions  Land and water decisions are not integrated  Implementation of IWRM (including land management)</p>	



Topic	Notes
<p>4.3.3 Structural needs Level-playing field options assessment – best combinations of natural and built Understanding planning cycle and involvement of stakeholders</p> <p>4.3.4 Delivering institutional change</p>	
<p><b>4.4 Enabling mechanisms</b></p> <p>4.4.1 Current approach Global and regional funding (e.g. development banks) National and private institutions</p> <p>4.4.2 Analytical frameworks WCD principals Precautionary approach Adaptive management EIA IWRM Ecosystem Approach</p> <p>4.4.3 Policies and laws Harmonization of policies on water and land Laws on environment, human rights and responsibilities</p> <p>4.4.4 Sustainable financing Payment for ecosystem services Sharing benefits</p> <p>4.4.5 Generating political will and support</p>	
<p><b>4.5 Knowledge gaps</b></p> <p>4.5.1 Key areas of uncertainty identified</p> <p>4.5.2 Responses required to fill the gaps</p> <p>4.5.3 International research agendas</p> <p>4.5.4 Cost (losses) and risk implications of current uncertainty and financing reducing uncertainty</p>	

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