Ecosystem services classification: a new classification survey

Dear expert

We are conducting a research on "**A new classification based on humanistic perspective (ESBHP): case study Saline lakes**". The main purpose of this research is to introduce a new classification of ecosystem services based on the humanistic perspective. To achieve the research purpose, we used a qualitative approach (Delphi method) based on expert judgments. In this context, we need experts' opinions about the new classification of ecosystem services for lakes. In this regard, we have prepared a brief introduction about this classification as follows.

Please kindly spare your time to answer the following question. Also, please feel free to add any additional comments about this classification in the space provided. All opinions will remain anonymous.

Thank you very much for your time and cooperation. Your feedback is very important to us.

Sincerely,

**Authors**

1. ***What is your opinion on new framework for lakes? Do you agree or disagree with this classification?***

\*For further information, please do not hesitate to contact me

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**Why another ecosystem services classification?**

There are several international classifications such as the Millennium Ecosystem Assessment (MA, 2005), The Economics of Ecosystem and Biodiversity (TEEB, 2010), the UK National Ecosystem Assessment (UK NEA, 2011), Common International Classification of Ecosystem Services (CICES), IPBES and several European Union research projects. Each of these classifications has weaknesses that have led to the creation of a new classification (Table 1).

**Table 1.** Approaches, weaknesses and strengths of important ecosystem services classifications

|  |  |  |  |
| --- | --- | --- | --- |
| **Framework** | **Classification approach** | **Strengths** | **Weakness** |
| **MA** | Integrity | Comprehensiveness in classification. Most used in research (generality). | The support services introduced are basic ecosystem structures and processes, but no services.  Energy services are not mentioned  Disproportion in classification groups |
| **TEEB** | Ecosystem economics | Separation of ecosystem functions from ecosystem services.  Attention to the economic values of services in the macro-classification approach.  More evolved than the MA classification system. | Habitat services are limited to ecosystem conservation features.  Energy services are not mentioned  Social services, unlike MA, are seen as insignificant |
| **CICES** | Hierarchical | Consideration of the hierarchical approach in classification.  Paid attention to ecosystem energy services.  Integration of the TEEB classification habitat into regulatory and maintenance services. | Regional application for EU member states  inverse the other classifications, it does not focus on trying to make ecosystem management decisions.  Service resolution for ecosystems. |

Considering strengths and weaknesses, a lack of clarity how the differences impact the validity and quality of the assessments can be observed. Thus, we provide a new classification based on fundamental human needs. Our focal point is Maslow's hierarchy of needs theory (1943). Specifically, Maslow theorized that people have five types of needs and that these are activated in a hierarchical manner (Kaur, 2013) (Figure 1)

**Human basic needs**

**Ecosystem services**

**Social**

**Physical**

**Biological**

**Emotional**

**Esteem and identity**

**Self- actualization**

**Affection and sense of belonging**

**Safety and protection**

**Physiological needs**

**Cultural**

**Economic**

**Ecological**

**Cultural**

**Regulating**

**Provisioning**

**Maslow’s Hierarchy of Needs**

**Figure 1.** a model that shows interlinkages between Ecosystem Services values (i.e. Ecological, Cultural, and Monetary), fundamental Human Needs as defined by Maslow (1943), and a new classification of Ecosystem Services base on basic Human Needs.

According to Maslow's theory, people who have grown up in an environment where their needs are not met are unlikely to function as healthy or balanced individuals. Therefore, humans depend on their environment to meet their needs, and the environment provides these services to humans. We argue that the common dimension of ecosystem services and human needs are classified into 3 main classes that better reflect human needs and ecosystem services. A large strand of literature has examined the ecosystem services of salt lakes. In this paper, we collected the ecosystem services of salt lakes through a literature review and experts (via email survey).

Table 3: ecosystem services for salt lakes

|  |  |  |
| --- | --- | --- |
| **index** | **Group** | **Services type** |
| * Animal pastures * Water for drinking * Water for non-drinking purposes | Raw (biotic) materials | Economic services |
| * Hunting waterfowl * Salt harvest * Fisheries and aquaculture * Special animal species for salt lakes(g. Artemia)Transformation industries * Development of tourism infrastructure * handicrafts | Employment |
| * Sludge therapy hot springs * Medicine plants | Medicinal resources |
| * The economic value of land | Economic value |
| * Identity * Sustainable livelihood * Vision(Landscape) | Landscape & amenity values | Social and cultural services |
| * Education * Research * Heritage / cultural values * Tourism / Ecotourism / Recreation * Intellectual and aesthetic appreciation * Spiritual and symbolic appreciation * Abiotic energy sources * Photography | Cultural values and inspirational services |
| * Air quality regulation * Local climate regulation | Climate | Environmental services |
| * Groundwater replenishment * Water regulation * waste management * Stabilization of salt deposits (prevention of their distribution to surrounding areas) * Water purification | Water purification& waste management |
| * Biodiversity protection * Maintaining populations and habitats | Biodiversity |
| * Erosion prevention * Disposal of sediments and pollutants * Prevent the advance of salt water) surrounding wetlands ( * Pest and disease control * Reduction and deposition of sediments and contaminants * Carbon sequestration * Maintenance of soil fertility * Pest and disease control * Flood prevention | Moderation of extreme events |

***Thank you***