Monitoring Recreational and Educational Services Provided by Mediterranean Wetlands: How Natural Capital Impact Human and Social Capital?

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Context and objectives

Since 2011, the Mediterranean Wetlands Observatory (MWO) is a wetlands management tool of the MedWet regional Initiative (1991) working under the umbrella of the Ramsar convention (1971) and managed by the Tour du Valat Institute for Research and Conservation of Wetlands (TdV). MWO is developing its first indicator on cultural ecosystem services as an "impact" indicator to be integrated in the DPSIR (Driver-Pressure-State-Impact-Response) conceptual model adopted by MWO. The overarching objective of this indicator is to develop additional advocacy based on sound scientific work among local and national decision-makers as well as planners involved in development options achievement and territorial management. This indicator also intends to help site managers to adapt their services to recreational and educational visitors. It aims concretely at measuring how ecosystem services biophysical value and function of wetlands provide human and social advantages to societies.

Methodology

Preparatory phase

The MWO indicator group decided by 2010 to develop an indicator on "the cultural services" that are provided by Mediterranean wetlands. Monitoring would take place in sites proposing recreational and educational structures and services, based on the collection of essential data on visitor attendance. This indicator would be based both on data availability and operational feasibility among the 27 Mediterranean countries involved in MedWet initiative.

Developing an "impact indicator": the MWO preliminary action was to develop first assumptions and key criteria to elaborate this indicator. The indicator should be easily understandable to decision-makers, scientifically sound, and based on reliable data that would be possible to collect in all countries in a sustainable way.

Between 2011 and 2014, nine site studies took place in protected wetland's sites among four countries (Algeria, France, Morocco, and Tunisia). The methodology included the interview of a total of 688 recreational and educational visitors, using open questionnaires based on individual perception and social representation of wetlands (Saïdi M.R, 2012; Rivière-Honegger A., Cottet M. & Morandi B. (2014). Sampling was based on the diversity of visitors' profiles in order to catch the highest diversity of perceptions and representations. Essential data included also site man-

agers' information, like the number of site visitors during the last 10 years (2002 - 2012).

In 2015, a synthesis on the main results within the nine sites was done by the TDV and The Mediterranean Agronomic Institute (IAM) of Montpellier, giving the key following results that were considered important for elaborating the indicator of cultural service in protected wetlands:

- In North Africa, the number of visitors depends more on external factors than on site managers'efforts of to promote and develop their sites;
- Wetlands attract mostly visitors coming from less than 35 km distance;
- Main criteria influencing the visitors' decision to visit wetlands sites are: the distance and access characteristics, the site manager promotion strategy, the natural and cultural attractivity of the site, the quality and diversity of visitor infrastructures and the services and facilities proposed by site managers, and lastly, the side-effect of near well-known sites.
- 30 levels of interest were reported by recreational visitors when selecting a site visit; quietness, nature, discovery, birds, socialization and recreational are the main common reasons for the visit;
- The representation of the wetlands natural capital for the visitors can be divided into three main types, from highly integrated "landscape and nature aesthetics and integrity", to "general ordinary biodiversity" and less integrated "emblematic elements, such species, cultural sites and site notoriety".
- The key dimensions of attraction during the visit are driven by landscape harmony, structured by vegetation, water and birds elements, and by the quality and diversity of the key facilities provided by the site manager and expected by the public at large to enjoy their visit.
- With about 60% of visitors having acquired new knowledge during their visit, wetlands protected sites are favoring environmental awareness and education. Effort and means of information developed by site managers are essential to explain the efficiency of the transfer of knowledge during the visit.

Indicator conceptual phase

Several steps are necessary to build the proposed "Mediterranean wetlands recreational and educational indicator".

The main challenge in this conceptualization phase is to switch from much diversified qualitative cultural results obtained from the series of social studies to an impact indicator that can be easily measured in all sites. In 2016, TdV and IAM started brainstorming on ways to develop such indicator, reflecting on its conceptualization and how to test its sensibility. If successful, the indicator will be validated and monitoring operation may start in 2017 in potentially 200 sites.

Based on the outcomes of this brainstorming period and on the review of a large bibliography, it was decided to base the indicator building process on the conceptual model developed by Ten Brink (2015) in articulation with the one developed by Kumar et al for Ramsar (2011). Both of them incorporate key elements to bring in the elaboration of this indicator, like the ecosystem services, the various capitals, the well-being, the livelihoods and the institutional and political dimensions. The

choice was made to develop a composite index indicator based on the multiple capitals, based on the following assumption: a Natural Capital, when accessible, can provide human and social advantages through recreational and educational entries.

We opted for of an indicator that would then be structured by the following components:

1. A natural dimension: the *ex ante* natural capital perception of visitors which refers to the site "natural quality", in terms of attraction and aesthetic;
2. The accessibility dimension: accessibility is essential to get advantages during the visit; this dimension refers to the capability model developed by Sen (Sen, 1985); it addresses external and internal accessibility together with visitors' facilities. This component is used as a filter, informing on public and site efforts to promote wetlands sites to the public. If accessibility is zero, no positive impacts can be gained from the visit.
3. The impact of the visit on human capital.
4. The Impact of the visit on social capital.

The graph 1 summarizes the cultural service indicator's structure. A preliminary scoring table is currently being tested using the data of the nine studied sites. Main results will be developed during the session.

Natural capital	**Accessibility Filter**	**Human capital (KH)**	**Social capital (KS)**
Based on the visitors' perception; with three levels	*Site capability and facilities; with three levels*	*The improvement of the visitors KH; with three levels*	*The improvement of the visitors KS; with three levels*
· High landscape and nature integration · Medium nature integration through ordinary biodiversity · Low integration with emblematic elements of the site (LI)	Material and security capability (external access, site facilities) · Economic capability (site fee) · Institutional capability (school and green club contracts)	· Production of knowledge · Transfer of knowledge · Acquisition of knowledge	· Partnerships with civil society · Creation/organization of specific events in the site · Multiplier effects through visitors

Graph 1. *The MWO Cultural Services Indicator Structure*

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