

Ecosystem condition accounts in Mexico.

Lessons in measuring ecosystem status (SEEA-EEA Mx) ¹.

At invitation of the United Nations Statistics Division (UNSD), Mexico has been participating since the year of 2014 as a pilot country in the application of the Advancing Natural Capital Accounting (ANCA), for the implementation of the Experimental Ecosystem Accounting Handbook (SEEA-EEA).

Achieving the results embodied in the engagements made can be explained by the close work with the stakeholder of the environmental sector of the country, with which a technical working group was formed to discuss technically the processes of information collection, methodologies and definitions that serve for the establishment of agreements and exchanges of information. This accompaniment procedure has allowed the institutions the institutions to get involved throughout the project, so knowing the procedures and results of the Ecosystem Accounting can provide to their sectoral projects.

In particular, the measurement of the ecosystems condition, according to the SEEA-EEA, is carried out from the priority components: water, soil, carbon and biodiversity. For this last component, the SEEA-EEA recommends to cover the issue from different perspectives, such as abundance, richness, species with risk categories and genetic diversity, considering the difficulties to get information. So, the discussion in Mexico has been aimed at identify biodiversity information sources in the country, in order to broaden the development and generation of information for the Experimental Ecosystem Accounting.

As a result of the exchange of ideas, a first agreement was reached (first step), which consisted in substituting the information of the Red List of the International Union for Conservation of Nature (IUCN) by the information of the Official Mexican Standard NOM-059-SEMARNAT-2010, because of the environmental sector of the country considers that Red List presents information at the global level and does not reflect the reality of the country, while the NOM contains information about the species in the country that are under some category of risk.

However, the Mexican list of species that is classified into four categories (probably extinct in the wild, in danger of extinction, threatened and subject to special protection). This only allows to know the status that the species keep in the country, but not enable to know the disturbances to which they are subjected, so that the information is directly related to the other priority accounts, in order to know the condition of the ecosystems in a general way.

In a second step, it has been identified studies as alternatives of the use of information on abundance of species, because it is considered that it is by no means a measure of ecosystem condition. In this sense, it is considered to assess the reduction of biodiversity wealth, induced by the loss of some priority species in the trophic chain, such as that of a super predator.

The continuous study and constant communication derived in the discussion with CONABIO on the advances on a study that they have been developing about a "Ecological Integrity Index (EII)"², which contributes to determinate the condition of the ecosystems in an integral way,

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² Source: Mora F., 2017. National- wide indicators of ecological integrity in Mexico: The status of mammalian apex-predators and their hábitat. *Ecological Indicators*. 82, 94-105. <https://doi.org/10.1016/j.ecolind.2017.06.030>

considering different indicators like the functional diversity, information on abundance of predators and preys, the selection of habitats, the trophic connectivity, among others. In such a way that this index can present a broader picture of the ecosystem condition based on its biodiversity (see table 1).

Table 1. Comparison of information for the determination of the condition of the biodiversity.

Advantages	Red List of IUCN	NOM-059-SEMARNAT-2010*	Ecological Integrity Index (IIE)*
Information about species with a risk category	✓	✓	✓
Country Specific information		✓	✓
Ability to adapt information to more detailed levels			✓
Georeferenced information on biodiversity	✓		✓
Interaction between different biodiversity indicators			✓

* The relevance of this information is that it supports the development of indicators that reflect the status of the national ecosystems.

Another advantage of the implementation of this project, is that the information is mapped, so that CONABIO scientists developed the study with information in cells of 1 km². This information is based especially on the relationship of mammalian predators, their prey and their habitat, due to their relationship with some structural patterns of ecosystems, it is possible to generate latent indicators through the modeling of equations structural.

Therefore, the specialists of the CONABIO recommended the implementation of this type of studies instead of using only the NOM-059-SEMARNAT-2010 or the Red List, due to their results represent in a better way the condition of the ecosystems based on the biodiversity in a given point.

It is considered that the use of this kind of information enables the analysis of the interaction of the available indicators at different levels of study: nationwide, statewide, municipal or regional, which transforms information into important tools for the generation of public policy.

Main conclusions

- The Ecological Integrity Index is able to reflect the ecosystem condition in an integral way, as a complement or replacement of the list of species with risk categories in the country.
- The realization of this kind of models allows the geographical visualization of the fauna, which complements the information of vegetation types.
- Due to the characteristics of the model, it is possible to adapt the results to different scales of interest for public policy.

Questions for the London Group

- Is IIE considered an appropriate parameter that could complemented the method for measure the condition/status of ecosystems?
- In which other country have studies such as IIE been developed?
- What other types of exercises could reflect ecosystem status based on biodiversity?
- Do you think this approach can support the SEEA-EA research agenda?