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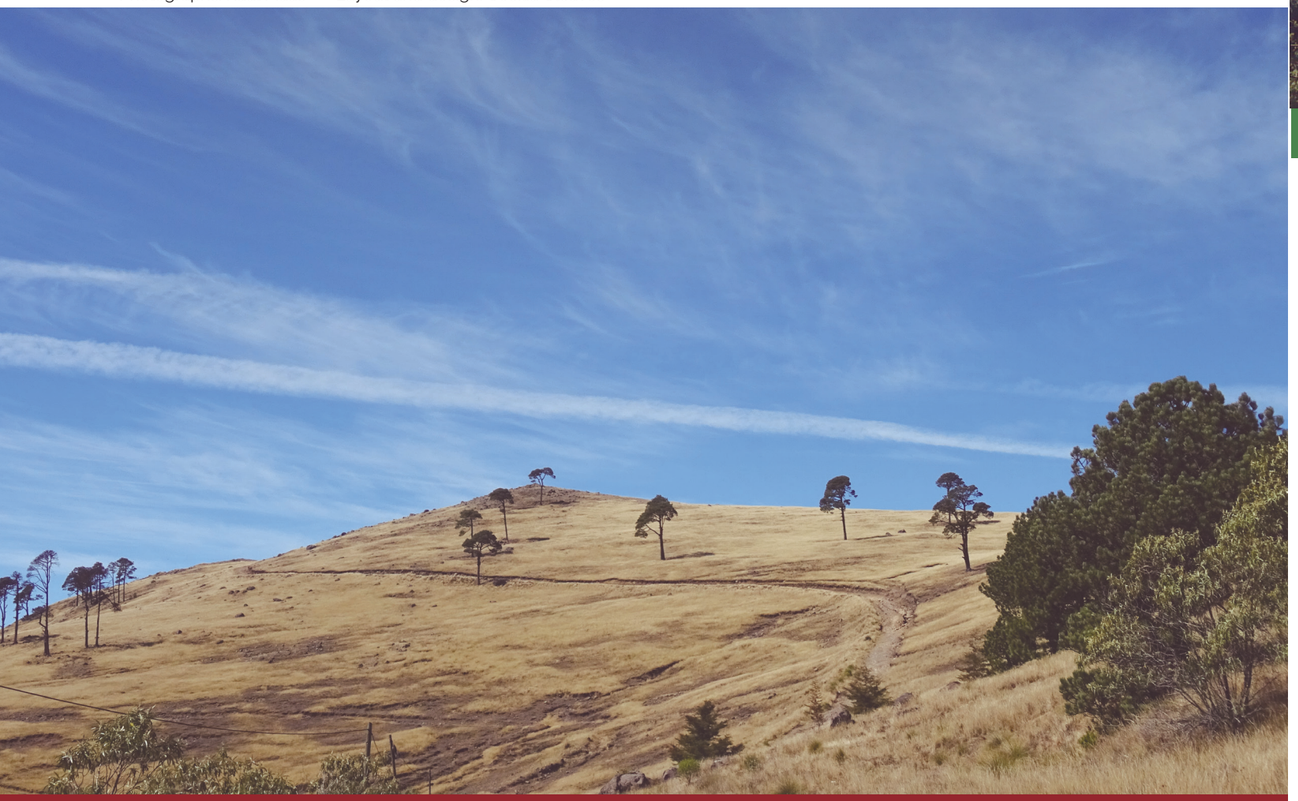

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Guatemalan Ecosystems

A Look from the Natural Capital Accounts

SUMMARY

This document presents the Guatemalan experimental ecosystem account, showing main results of three sub-accounts, namely: Extension Account, Condition Account and Services Supply Account. In addition, preliminary results of the Valuation Services Account are also introduced. The Extension Account starts with a classification of ecosystems based on the life-zone methodology, allowing a general view of Guatemalan diversity. Ecosystem life-zones are then extended with land use information. The Condition Account presents three indicators: forest cover, the Normalized Difference Vegetation Index (NDVI), and protected areas, all of them classified by life-zones. Ecosystem Services Supply Account was estimated by protected area, accordingly to the category of management approved in Guatemalan legislation. Economic valuation was estimated based on 21 valuation studies undertaken for 32 ecosystem services. It can be concluded that Guatemalan ecosystems provide a great variety of provision, regulation and cultural services. However, administration institutions should focus on threatens such as deforestation, fragmentation, land use change and lack of protection. The methodology and approach used in the Guatemalan case can be adapted in other tropical countries. Results could be estimated at the national level, because the starting point was a national systemic view of Guatemalan ecosystems.

Biodiversity and Ecosystems in Guatemala

Guatemala is recognized as a megadiverse country (Castañeda, 2008). It is possible due to its extensive variations in altitude and precipitation in a relatively small area (108,889 km^2), with a relatively old geological origin, located between two different biogeographic regions (holarctic and neotropical) and in the middle of two oceans. The mountainous chains oriented west-east are biological corridors that connect the northern and southern hemispheres.

The natural richness is characterized, for example, by the existence of 192 species of native mammals and 486 species of birds (considering only those that breed in the country), as well as by the diversity of amphibians, highlighting the Plethodontidae family (salamander without lungs) with the largest number of species of the world (41 species, 19 endemic) (Méndez, 2008). The floristic diversity of Guatemala has approximately 321 families, 2,478 genera and 10,317 species (including algae, lichens, fungi and liverworts), of which 823 species have some type of endemism and 538 are restricted to Guatemala (Véliz, 2008).

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To classify the variability of ecosystems in Guatemala, the Holdridge-based life zones methodology (Iarna-URL, 2018) has been used, which is based on the delimitation of plant formations with distinctive floristic features based on climate data and with an ecosystem approach. The country has thirteen life zones, which are differentiated according to variables of precipitation, temperature and evapotranspiration.

To incorporate ecosystem good and services, the Experimental Ecosystem Account has been presented (Iarna/URL, 2019). This document summarizes the accounts of extension, condition and supply of ecosystem services in physical terms, and also presents a compilation of valuation case studies as a first approximation of the supply of ecosystem services in monetary terms.

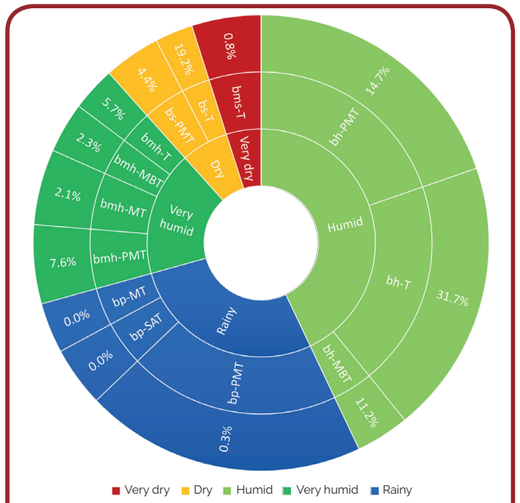

Figure 1. Guatemala´s ecosystems extension

bms-T: very dry tropical forest
bs-T: tropical dry forest
bs-PMT: tropical premontane dry forest
bmh-MT: very humid tropical montane forest
bmh-T: very humid tropical forest
bmh-MBT: very humid low montane tropical forest
bmh-PMT: very humid premontane tropical forest
bp-MT: tropical montane rainforest
bp-SAT: tropical sub-andean rainforest
bp-PMT: tropical premontane rainforest
bh-MBT: humid low montane tropical forest
bh-T: tropical humid forest
bh-PMT: humid tropical premontane forest

Source: IARNA-URL (2019)

Guatemala's Ecosystem Extension Account

The extension account is presented according to the life zones of Guatemala (figure 1), along with their indicators of forest cover and land use.

The country is divided into thirteen life zones, where the zones of the tropical humid forest (bh-T) and the tropical dry forest (bs-T) represent 51% of the national territory. Both ecosystems have been affected by significant processes of degradation, depletion and pollution in more than two thirds of their original coverage, which affects the management of the biological diversity found there (Iarna-URL, 2018)

The ecosystems of humid tropical premontane forest (bh-PMT) and humid low montane tropical forest (bh-MBT), represent 26% of the total area of the country. Together, the four ecosystems mentioned above cover a proportion equivalent to 77% of the country.

Three ecosystems in rainwater provinces represent 0.33% of the total extension of the country, these being the tropical premontane rainforest (bp-PMT), tropical low montane rainforest (bp-MBT) and tropical sub-andean rainforest (bp-SAT). These three ecosystems have special rainfall characteristics and, consequently, have strategic importance because of the biological diversity they harbor or that they have the capacity to house.

Twelve land-uses are identified for Guatemalan ecosystems (figure 2). Most of them have agriculture presence, except for the tropical montane rainforest (bp-MT) and the tropical sub-andean rainforest (bp-SAT), which have less than 0.05% of its extension dedicated to this use.

The ecosystems with the lowest proportion of forest cover are the tropical sub-andean rain forest (bp-SAT) and the very dry tropical forest (bms-T). The ecosystems with greater forest extensions, in proportions greater than 56% of their total extension, are the tropical dry forest (bs-T), the very humid low montane tropical forest (bmh-MBT), the tropical premontane rainforest (bp-PMT) and the tropical montane rainforest (bp-MT).

water regulation service (5%) (Iarna/URL, 2019). Finally, the provision service valued a total of US$ 111,067,127, of which 52% is related to the provision of food (agriculture with 22% and fishing with 30%) and 36% is due to the provision of transportation (Iarna/URL, 2019).

Next steps will update values for strategic ecosystem services as well as to estimate values for those areas not considered so far.

CONCLUSIONS

This document presents the advances of Guatemala in the construction of the Ecosystem Experimental Account, showing the results reached to date: the extension account, the condition account and the supply of ecosystem services account, all in physical terms. Also, preliminary results for the monetary value of ecosystem services provided by the main protected areas in the country are presented. All results were analyzed through geographic information systems (GIS), generating output tables and maps.

The main contributions of Guatemala in the Experimental Ecosystems Accounts are twofold. First, it is proposed to start with a general view of ecosystems at the national level. The one presented in this document is based on a classification of ecosystems consistent for tropical countries, which allowed to classify Guatemalan biological diversity into thirteen territorial units. Second, the general view allowed analyzing the main territorial dynamics of biodiversity and the identification of main ecosystem services provided by each territorial unit. The advances presented by Guatemala show a systematic way to present the Ecosystem Account at a national scale.

Following steps include updating monetary values of main ecosystem services and estimating those values not considered so far. It is also expected to complement the extension and condition accounts with ecosystem assets not included in this report, such as aquatic and marine-coastal ecosystems.

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