PRO-AGUA NATURAL RESILIENCE IN THE AMAZON

Creating scenarios and modeling of ecosystem services in the MAP region

Jorge Caballero [1], Martin Pillaca [1], Charlotte Weil [2], Marcelo Guevara [2], Rafael Schmitt [2], Francisco Roman[1], Marta Torres [1], Cesar Ascorra [1], Luis E. Fernandez [1,3], Adrian Vogl [2]

[1] Centro de Innovación Científica Amazónica – CINCIA, Madre de Dios – Perú, [2] NatCap (The Natural Capital Project at Stanford University), [3] Center for Energy, Environment and Sustainability, Wake Forest University

INTRODUCTION

The scenarios are a description of future possibilities, basically they are located between the world of facts and perceptions. (Postmaa et al, 2005). With the help of local actors, experts in tourism, water resource management, carbon, protected areas, agriculture and land use planning, from the different institutions in the Madre de Dios and Pando region, a workshop was held to identify shared areas of interest that can be used to develop a vision of future sustainable land use scenarios Realistic (business-as-usual?) and worst case scenarios for 2035 in the focus areas of Tahuamanu - Cobija (Peru-Bolivia) and Puerto Maldonado - Mazuko (Peru).

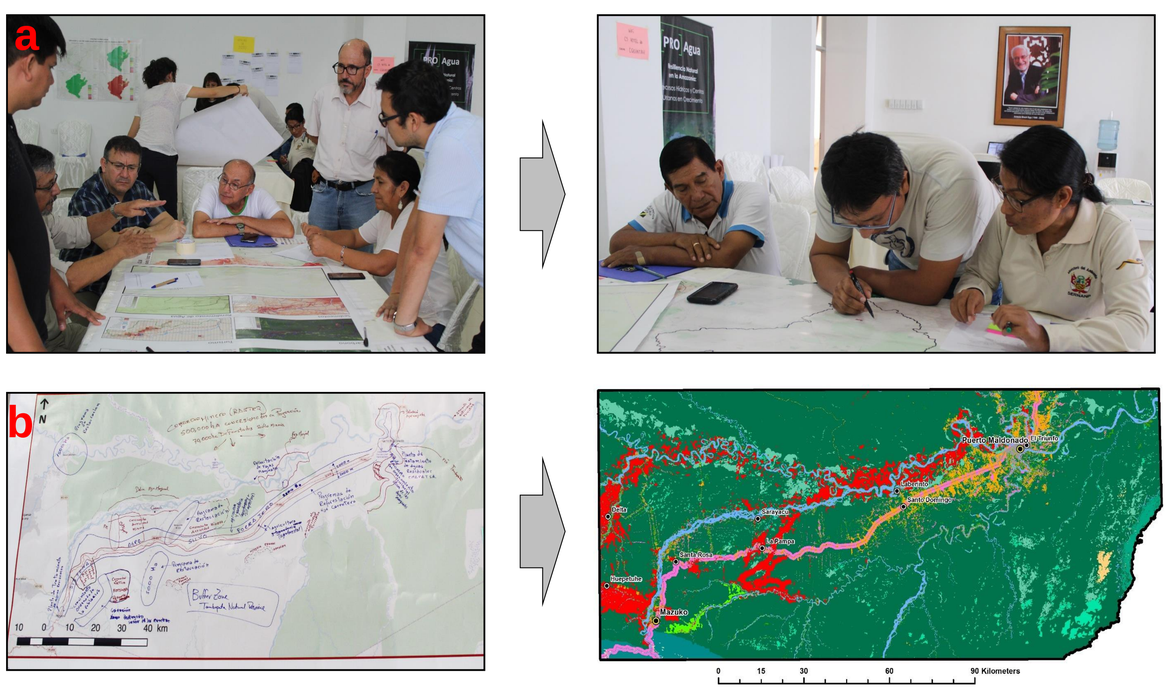

Figure 1. Complete workflow a. Local experts drawing scenario b. Digitalization of the study area. Puerto Maldonado - Mazuko.

MATERIALS AND METHODS

The areas of study cover the regions of 1. Tahuamanu - Cobija (Peru-Bolivia) and 2. Puerto Maldonado – Mazuko (Peru). Spatial information was compiled from local experts on scenarios: A. Sustainable, B. Realistic and C. Worse for the 2035 of land use, natural and private protected areas, tourism, fauna, diversity and climatic data.

Land use maps were digitized for both areas of study and spatial and climatic data were modified to recreate the scenarios based on the recommendation of local experts.

Ecosystems for export sediment and carbon stocks were modeled for each scenario for both areas of study.

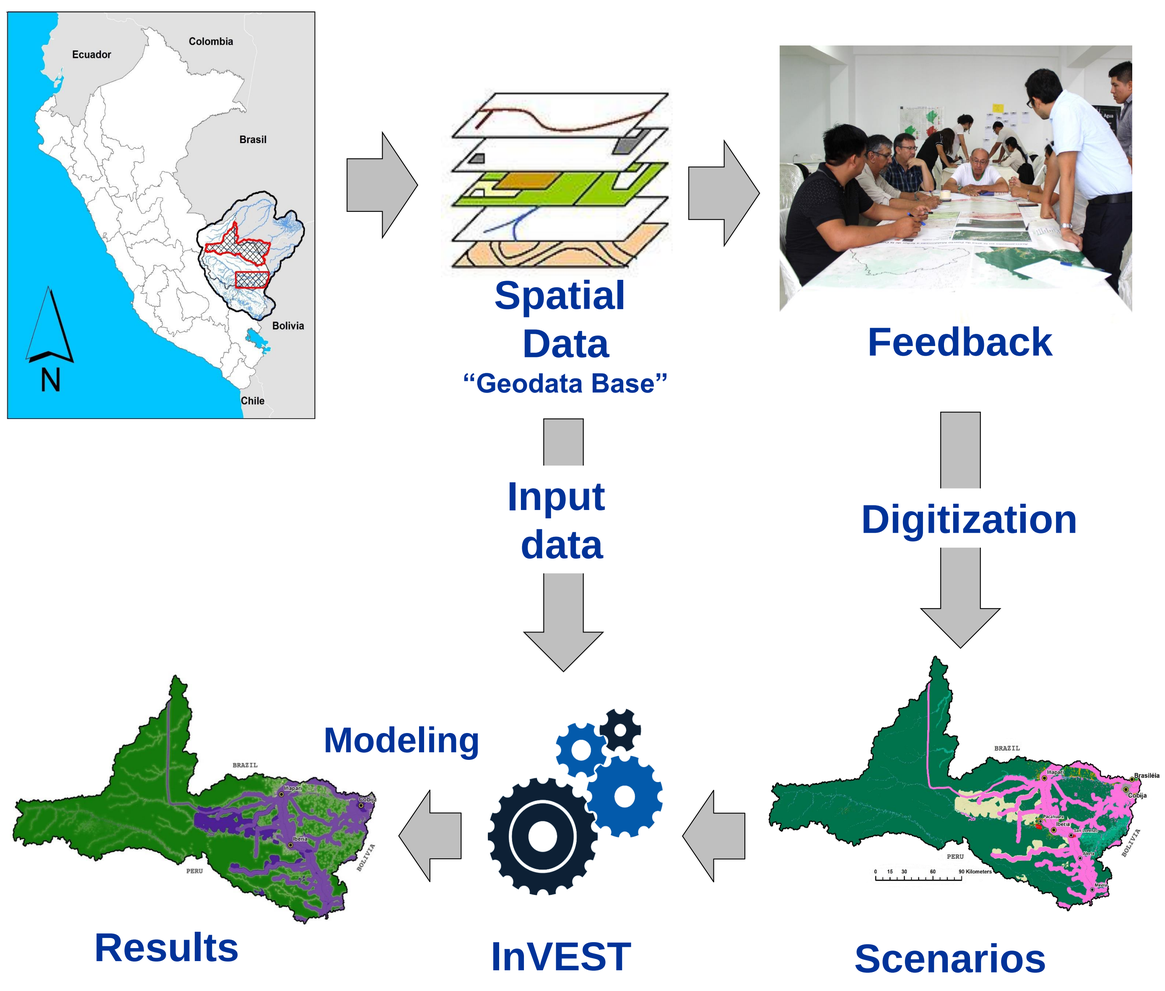

Figure 2. Spatial data workflow with InVEST to create scenarios and ecosystem service models for focus areas.

RESULTS

3 scenarios were generated for the area Puerto Maldonado-Mazuko and 2 scenarios for Tahuamanu-Cobija. In addition, 2 ecosystem services were modeled: a) stocks of carbon and b) Export sediments for both areas of study.

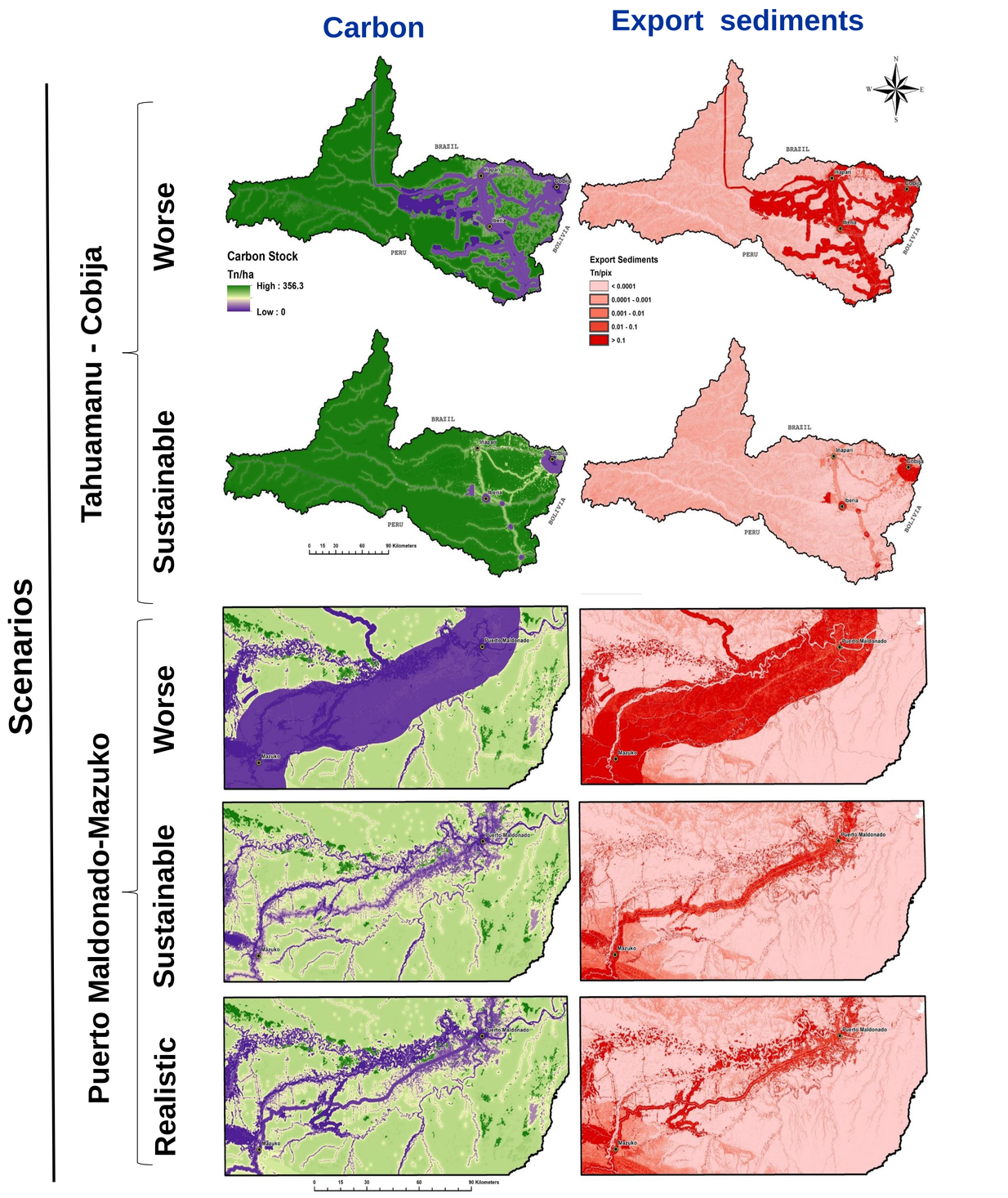

Figure 3. Modeling of carbon and Export sediments for scenarios: sustainable, realistic and worse for both areas of study

CONCLUSIONS

A worse scenario shows that without territorial planning and watersheds, degradation of ecosystems would be radical in both areas of study, in terms of carbon stocks and export sediment. To continue with the usual management, the degradation of the ecosystems would continue with the same trend. On the other hand, by planning land use in both areas of study on the basis of a sustainable scenario would minimize the impacts of extreme natural events and climate change.

ACKNOWLEDGEMENTS

We want to thank the following people for their contributions and/or assistance in carrying out this work: Luis Gallegos, Jesus Fidhel to all local experts in the MAP region and the developers of the InVEST models. This project is developed thanks to the support of Gordon and Betty Moore Foundation.

REFERENCES

Sharp et al. 2015. InVEST 3.5 User's Guide. The Natural Capital Project, Stanford University, University of Minnesota, The Nature Conservancy, and World Wildlife Fund.

Postmaa, T.J.B.M. & Liebl, F., (2005). How to improve scenario analysis as a strategic management tool? Technological Forecasting and Social Change, 72(2), pp.161–173.

Pro-Agua 2018. Banco de Datos. Puerto Maldonado, Perú. https://drive.google.com/open?id=13gdtuhu9f2yh1gvr-Pw32Sevclia_Xlv