Response to Comment on “The extent of forest in dryland biomes”

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De la Cruz et al. question the reliability of our results, claiming that we do not refer to the most appropriate spatial extent of drylands. In our response, we explain why we chose an existing and internationally recognized delineation of drylands among several options, and why our findings are due to a difference of remote sensing technique and not to the definition of drylands we have selected.

We thank de la Cruz et al. (1) for their comments on our article (2). However, it seems that the main reason that they regard our study as “unreliable” is the delineation of drylands that we used and the definition of dryland boundaries that this employs.

We did not aim in our article to discuss the extent of drylands. A variety of maps of climatic zones have been produced, each favored by some groups and not by others. We had to choose one of these maps to provide the boundary for our assessment, and so we could have been criticized whichever map we chose. We are aware of limitations related to the United Nations Environment Programme (UNEP) World Conservation Monitoring Centre (WCMC) delineation of drylands, constructed by Sörensen (3). However, UNEP-WCMC is a highly respected international environment mapping organization, and so it is not surprising that it was selected by the Convention on Biological Diversity (CBD) and the United Nations Convention to Combat Desertification (UNCCD) to produce a map of the world’s drylands that complies with definitions of drylands in the two conventions. These considerations, together with the fact the UNEP-WCMC map was produced quite recently (in 2009) and is available in digital format, were the main reasons why we chose this map to frame our assessment and to compare our findings with previous maps within a common framework.

Although we acknowledge that the definitions of drylands (including the one by UNEP-WCMC) can be discussed, our reassessment of the extent of forest in drylands did not rely on a modification of the definition of drylands. Rather, our study showed that for a given area, the “augmented visual interpretation” approach of Collect Earth (4) detected trees that were not seen with the classical remote sensing approach, especially in the areas with low tree cover. These differences between “augmented visual interpretation” and classical remote sensing will remain, irrespective of the precise limits taken for the drylands. When comparing different methods, it is more important to compare estimates of the extent of drylands within a fixed geographical zone independently of the exact definition of drylands. The influence of definition on the estimates of forest areas is an issue that has already been highlighted (5, 6).

Because Collect Earth is more efficient at detecting trees than classical remote sensing techniques where tree cover is low (7), changing the geographical window of observation of drylands will inflate or deflate the differences that we have disclosed, depending on the forest structure. The Ecuadorian region has relatively high tree cover, and accordingly there was no difference between the Collect Earth estimate of forest cover and previous estimates for this region. By contrast, the Miombo regions in Africa that were excluded from our observation window are likely to have forest covers that have been underestimated by previous techniques, as in Tanzania (8). Therefore, accounting for areas mentioned by de la Cruz et al. would most likely increase the relative difference we observed with our approach, rather than decreasing it.

Finally, having clearly defined what we were considering as drylands, we do not believe that our study inflates forest estimates in dryland biomes. In addition, as we have openly shared our database online, as well as the tools needed to analyze it (www.openforis.org/tools/collect-earth.html), our fellow scientists can reclassify our findings according to the particular climate zone classification that they favor.

REFERENCES AND NOTES

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