

## ***Interactive comment on “Soil bio-engineering for risk mitigation and environmental restoration in a humid tropical area” by A. Petrone and F. Preti***

### **Anonymous Referee #1**

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1. General comments: This interesting site-specific project report deals with a highly relevant topic deserving much attention. A big effort is also made to discuss the involvement of local communities in defining and implementing the project. Therefore, this study has the potential to become of significant value both to scientists and managers working on bio-engineering techniques for land rehabilitation in harsh conditions in the tropics, in collaboration with local communities.

Nevertheless, if the intension of the authors is to publish this manuscript as a scientific paper in HESS, it will need a serious revision. In that regard, it still suffers from important, especially technical, shortcomings.

First of all, English language needs serious improvement. I made a few suggestions  
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for correction, but these are far from complete: it is strongly advised to have the entire manuscript thoroughly screened by a native English speaker, preferable someone who is familiar with the research theme.

Furthermore, I have a few concerns with regard to methodological aspects (See also “specific comments”)

Ultimately, I believe the currently available literature dealing with these topics is underutilized. Many reports are referred to, but few recent publications are mentioned. (See also “specific comments”).

In conclusion, I would like to encourage the authors to seriously revise the present manuscript, in order to increase the impact of their valuable work and to address a wider scientific public.

2. Specific comments (individual scientific questions/issues) Methodological considerations - What are the provenances of the plant material used? - No details on the number of plant replicates per species/treatment? Statistical results, together with means, standard deviation and no of replicates could be presented in a table for the merit of the potential reader. - Since survival and plant growth performance are expected not only to be species-specific but also to depend largely upon the growth conditions, it would be interesting to get some more information on the soil environment of the exact places where the installations have been built: at least: water availability, texture, soil type? - In that perspective, especially towards practical recommendations, we wonder why potential environmental effects have not been elaborated upon (phenotypic plasticity?). - With regard to the measurements of height and diameter: were the initial dimensions also assessed? If so, it would be interesting to present growth rates. If not, how did the authors correctly differentiate initial differences from changes caused by differences in growth environment? - Given the importance of the studied species for e.g. firewood and fodder, it seems very relevant to me to determine (or estimate through allometric relations) biomass development. - In conclusion, I believe more

relevant growth variables could be evaluated, statistical analysis could be expanded (maybe taking into account other potential sources of differences) and presentation of the data needs improvement.

Better linking the technical and social methodologies The effort made to involve the local communities in defining and implementing the project, is highly appreciated since of uttermost importance. Nevertheless, a few concerns can be raised: (1) The species selection criteria used in this study are merely based on financial viability and suitability for soil bioengineering techniques, whereas towards application it is important to consider a much wider range of ecological, socio-economic and even socio-cultural criteria. Although the intentions of the authors to consider the problems of land degradation in an integrated way are made clear, I could not find any concrete results or recommendations in that regard. Even if not dealt with in this study, I suggest at least to shortly addressing this issue in the discussion. (2) Furthermore, the image of “consensual (village/local) communities” – where the authors depart from (at least as suggested in their methodology) - has repeatedly been shown to be a poor reflection of empirical reality (see e.g. Leach et al. 1999; Olivier de Sardan 2005). In fact, the authors point out in their introduction that this image does not strike with reality in their study area (see rich landowners versus (land-)poor). All negotiation processes reflect prevailing power structures (Leach et al. 1999), hence also the participatory processes set up by the authors to get to know the priorities of “the local communities”. We are therefore wondering whether and how the authors have tried to avoid the “hijacking” of their participatory forum by local elites, and the exclusion of the poor? Or in other words: in how far do the site-selections by the community leaders, the species selection by the communities and the decision to contribute labor to the project reflect the interests of the poor/farmers and not e.g. of the large landowners? (3) Are the proposed soil bio-engineering measures for implementation in private or communal land?

Leach, M., R. Mearns & I. Scoones 1999. 'Environmental entitlements: dynamics and institutions in community-based natural resource management', World Development

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27, 2: 225-47. Olivier de Sardan, J.-P. 2005. Anthropology and development: understanding contemporary social change. London & New York: Zed Books.

3. Technical corrections (typing errors, etc.) General remark: Only a few suggestions for language improvement are made here, but as suggested above, the entire manuscript needs to be screened in detail by a native English speaker.

Everywhere: - Replace “vegetable” by “plant” and “vegetable matter” by “vegetative material or plant material”

Abstract: - line 4: autochthonal (not autochtonal): how do you define this? Why not using “indigenous”? Or is there a difference in definition? - line 5: these two issues - line 5: divulgation: use a better term - line 7: tropics

Introduction: - Pg 5141 line 6: give reference - line 21-22: no recent works? - line 27: idem - Pg 5142 line 10: “... in Léon, Nicaragua.”

Materials & methods: - Pg 5143: area description should be limited to presenting those aspects relevant for the present study - line 13: 700 km<sup>2</sup> - mention only population density, it's not that useful to give exact numbers - line 18-23: shorten: this is not relevant for the study topic - Pg 5144: I suggest to remove line 8-12 - Line 13: focusing i.o. focused - Line 24: drain i.o. empty - Pg 5145 line 14: point of view i.o. standpoint - Pg 5145 line 6-25: relevant, but not to be addressed under “materials & methods”. It's recommended to address this issue shortly in the introduction, but especially to come back to it in the discussion part under a separate heading. - Pg 5148 line 10 – pg 5149 line 11: references needed - Pg 5150 line 6: which diameter was measured? Diameter at the base?

References: - Pg 5159 first line: not Poisen but Poesen

Figure layout: - Figs. 7 & 8: remove the decimals from the units in the Y-axis, and remove the grey background

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