

## ***Interactive comment on “Suitability of soil bioengineering techniques in Central America: a case study in Nicaragua” by A. Petrone and F. Preti***

**Anonymous Referee #2**

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Interactive comment on “Suitability of soil bioengineering techniques in Central America : a case study in Nicaragua” by A. Petrone and F. Preti

The paper “Suitability of soil bioengineering techniques in Central America : a case study in Nicaragua” represents investigations on the one hand to impart the knowledge and on the other hand to develop applications of soil bioengineering techniques with a special local focus to the area of Nicaragua. The authors finally recommend three local plants and the technique of vegetated crib walls in Nicaragua.

Specific comments: P 380 line 15: The technique of soil bioengineering has been very old (age of several thousand of years) and in Central Europe it was rediscovered again in the last century. On this account also the pioneer phase has started much earlier.

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P 380 line 16-20: Soil bioengineering is based on two fundamental issues independently from a world wide application. The basic for each application is the suitability of soil bioengineering plants and second special techniques are used depending on what is required for civil engineering structures. Therefore it is possible to transfer soil bioengineering techniques to developing countries but for the potential local bioengineering plants basic research is essential. Most of the mentioned projects focus primarily on plants to understand the technical and biological properties. The two steps (plants and techniques) should be clearly separated.

P 380 line 23: Why there is an interrelationship between best type and temperature and pluviometric conditions. A type (soil bioengineering technique) is much more relating to specific geotechnical and hydraulic aspects of the construction site. No focus is given to an economical issue, even though it is mentioned as one of the main results in the abstracts.

P 381 line 1: First results are already mentioned in the introduction.

P 381: Background and the criteria of the selected plants as well as the species of plants are described reasonable and in detail.

P 381 line 13-15: From the point of vegetative reproduction the number of different plants is a decisive factor due to their genetic provenance. Why were unequal numbers of different plants for each investigated plants configured. This is a relevant issue to a homogeneous sampling size for the different plants.

P 383 line 20-24: The plantation of the cuttings is described. The vertical plantation of the cuttings is not the optimised method, which was mentioned by the authors. The average length of the cuttings was around 150 cm. But the holes for plantations have just been a depth of 30 cm. What is quite unusual for soil bioengineering cutting plantation is the relation of the part which is covered by soil to the residual part of the cutting and does not fit with the general technical of cutting plantation. P383 line 25-30: All the plantations were irrigated in the same to simulate the monthly mean precipitations be-

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tween 1974 and 2000. It could be interesting for future bioengineering research work to know something about the resistance of dryness of different plants especially if this is a limited factor for the local suitability of plants.

P384 line 2: It the plants have been extracted (and not excavated), it is not clear how the rooting performance can be quantified. A detailed scientifically methodology is missing. The meaning of rooting percentage (is it the same as survival rate?) and vigour (methods?) is not clear. Essential plant parameters such as above and below biomass, numbers, diameters and length of new shoots are not considered.

P384 line 5: The slope grating is mentioned first. Is it an objective to compare a vegetated crib wall with a slope grating?

P384 line 11-15: A matrix table could be helpful to show clearly an overview what parameters at what time are the base of the data sampling.

P384 line 16: It is not clear what the meaning of a qualitative monitoring is?

P384: Also the method of analysing (e.g. statistical tests) of all the data sets should be described in detail as a part of methodology. P384-386: The results for the monitoring steps are presented in a different way according to scale and accuracy. The results of the first steps are described in detail whereas just the date of the last one is mentioned.

P387 line 10: What supposed by various possible causes of failure and transporting damage? Is it reasonable that this species of plant is not successful for vegetative reproduction. P387 line: The considerations to the work's cost are just part of the chapter of discussion. If it is an important part of this study it should also be part of the chapter methodology and results.

P394-403: All figures should be referred in the text.

P401: What kind of technique(Fig. 8)? P403: What kind of technique (Fig 10)?

General comments: The paper needs to revised scientifically focused on the investiga-

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tions to plant performances in the scope of soil bioengineering with a clear structure of problem definition, methodology, data sampling, analysis and results and finally integrated in the discussion

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 5, 379, 2008.

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