Hydrology and
Earth System
Sciences
Discussions

# Interactive comment on "Coevolution of water security in a developing city" by V. Srinivasan

**Anonymous Referee #3**

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The paper presents an example of socio-hydrological modelling for the city of Chennai, India. The research question, i.e., "why" water systems evolve the way they do, is extremely interesting. The illustration of the problem in the introductory part is very well written. The way the problem is addressed, i.e., by investigating counterfactual trajectories through a dynamic model, is interesting and revealing. I am therefore supportive for the publication of the paper on HESS. Nevertheless one part of the paper should be improved: the presentation of the model. Particular care must be devoted to the description of the equations, which are in many cases not well defined (see comments below). Not all parameters are defined and the measurement units are missing (sometimes the dimensionality of the equations looks wrong). It would be very useful to add a table with the model variables and parameters, their description, measurement units and values in the examples of the paper. Since the model is simple, it would maybe be of help to write all equations together so that their coupling is made explicit. In the

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present state, it is hard to identify the feedbacks that are modelled.

Some more detailed comments follow:

Page 13268, line 1: "Integrated Water Resources Management"

Page 13269, line 19: check Di Baldassarre et al. (2013): The paper cited (Di Baldassarre, G., Kooy, M., Kemerink, J. S., and Brandimarte, L.: Towards understanding the dynamic behaviour of floodplains as human-water systems, Hydrol. Earth Syst. Sci., 17, 3235–3244, doi:10.5194/hess-17-3235-2013, 2013) is surely related to the discussion here but the "toy" model is in "Di Baldassarre, G., Viglione, A., Carr, G., Kuil, L., Salinas, J. L., and Blöschl, G.: Socio-hydrology: conceptualising human-flood interactions, Hydrol. Earth Syst. Sci. Discuss., 10, 4515–4536, doi:10.5194/hessd-10-4515-2013, 2013".

Page 13274, eq. 2: what is alpha? Please add the measurement units for all variables in all equations. For instance in Eq. 2 the measurement unit do not seem correct.

Page 13275, eq. 4: check the equation, does "cot" mean cotangent? I guess not.

Page 13277, eq. 8: what is gamma?

Page 13279, line 8: is I the integrity of the pipeline whose variation is defined in Eq. 8?

Page 13280, eq. 16: please add a reference to the study/report in which the empirical model has been obtained.

Page 13280, eq. 18: is t measured in years? Does (t-1) mean the preceding year?

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 10, 13265, 2013.