



Interactive
Comment

Interactive comment on “Forecast-based financing: an approach for catalyzing humanitarian action based on extreme weather and climate forecasts” by E. Coughlan de Perez et al.

E. Coughlan de Perez et al.

coughlan.erin@gmail.com

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We appreciate the thoughtful comments and suggestions on this manuscript. Our replies to specific suggestions are below.

COMMENT: I enjoyed reading the paper, which discussed an important issue with potentially large benefits for affected population. I think it makes the point very clearly.

AUTHOR RESPONSE: We appreciate the comment and discussion on this.

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COMMENT: - At first, I did not understand the definition of your “percent of actions that were worth while”. I find it confusing because of one warning, you will have many actions (e.g., evacuation plus pre-positioning of supplies) and your phrasing suggests that some of them will be worthwhile and others won’t. In fact, you’re thinking about a repeated exercise and the R is the average over many events. I would change the label and use the classical words (correct alarm ratio). AUTHOR RESPONSE: Thank you for the recommendation; this has been changed.

CHANGES TO MANUSCRIPT: [Section 3.1 Matching forecasts with actions] For a forecast lead time and probability p , we derive the variables in Table 1, to answer the following question: “if we take action every time the forecast exceeds the threshold, how often our action be followed by a disaster, and therefore be worthwhile?”. To do this, we estimate the correct alarm ratio $R(p)$ (fraction of all forecasts of probability p) as:

COMMENT: - In Eq (2) and later, you introduce a “ n ”, assuming that a and b are number of cases, while you referred to them as probabilities before. I would use the probability always, and remove the n .

AUTHOR RESPONSE: In Eq (1), a and b are still the number of cases. We believe it is important to retain the n , as using a probability alone would mask the sample sizes.

COMMENT: - I think the text would benefit from more example of actions, to make it more concrete (it is just bringing some of the examples from Fig 1 to the text – it’s especially needed because the journal has the figure at the end and not in the text. .).).

AUTHOR RESPONSE: Nice idea; see changes below.

CHANGES TO MANUSCRIPT: [Section 3.1 Matching forecasts with actions] For example, people are not able to build drainage canals based on a short-term forecast, but could create teams to clear existing drainage canals based on a seasonal forecast. In comparison, flood response drills could be carried out within a few hours or days of the forecasted disaster (Figure 1) & For example, it would not make sense to evacuate based on a low probability forecast, but perhaps flood response drills would be appropriate as they can withstand “acting in vain” (Figure 1).

COMMENT: If your budget is too low, you assume that you do less of everything. I was curious whether – in practice – we use this strategy, or if we focus on the cases with higher probabilities. (e.g., you do nothing is the probability if lower than 50%, but you do everything (like without budget constraint) when the probability is higher than 50%). How could we compare the efficiency of the two approaches?

AUTHOR RESPONSE: In fact, there was a typo in the original manuscript, and equation 5 should actually read as below in changes to manuscript. Your point is an interesting one; we assume that you would like to disburse funding proportional to the probability of disaster. If we remove that assumption, you would be free to maximize for another variable, perhaps disbursing funding proportional to the effectiveness of the action options.

CHANGES TO MANUSCRIPT:

$T = \int_0^1 ((a+b)/n)(p)^n D(p) dp$ [5] where $D(p)/((a+b)/n)(p)^n$ should be equal for all values of p . & This method assumes that funding should be allocated according to the likelihood of disaster, although this assumption could be replaced by other priorities, such as allocating funding according to the effectiveness of the actions.

COMMENT: Finally, you're looking at your budget constraint like if the realized losses

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will be equal to the expected losses. But there is a lot of variance. I'm wondering whether you do not want to say instead that you want your budget to be sufficient 90% of the years, and use the variance to calculate how much precautionary investments you want to make (you can also use a more sophisticated approach in which you're careful at the beginning of the year when many things could happen, and because less careful when the year's end approaches – it's clearly not optimal in general, but it is the best approach if you have annual budget without the option of “borrowing” on next-year budget.).

AUTHOR RESPONSE: Because the Preparedness Fund is only used for forecast-based action, variance in realized disaster losses will not affect the amount available in the fund (but will affect the effectiveness of the interventions, compared to what was estimated as their effectiveness or benefit-cost ratio). However, you are correct that there is variance in the cost of action from year-to-year, and this would need to be taken into account in the fund design. See below inserted text.

CHANGES TO MANUSCRIPT: [3.2 Funding mechanisms] It would also be possible to set time-varying thresholds to be more conservative in spending at the beginning of available time period, and more free with spending the remaining amount as the end of the budget period draws near. When calibrating the system over a longer time period, we recognize that thresholds may vary to reflect progress in insights or changing drivers.

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 2, 3193, 2014.

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