

Authors reply to review #2

Thank you for your comments! We, the authors, are very glad to respond and discuss those questions in comments in details.

Q: In the review of literature, several approaches are detailed but the authors do not explain which elements of those methods they capture in their approach. For example, it is not clear which aspects of Chau et al (2015) approach they take. In the same vein, macroeconomic approaches such as CGE or IO approaches are cited but the authors do not precise why they are useful for.

A: In the review of literature, we divide those evaluation methods of economic impacts into three perspectives. From the perspectives of income loss and profit loss, the absolute value of economic loss can be assessed easily and such value will be useful of business runners or stakeholders, but they are not that proper for comparing economic impacts among economic bodies. The perspective of percentage loss are good at comparing impacts but it is usually used in macro-economy research.

To address the gap of comparing impacts while showing loss in profits, we intend to apply the perspective of profit loss rate which takes both profit loss and percentage loss into consideration. These are the main connections of our literature review and the method we use. We have to admit that the part of literature review can be better after revision. We will revise this part to make it more explicit in the new manuscript.

Q: I was very surprised that no literature was cited concerning the use of autoregressive error model in the introduction. Some references are cited in the section "estimation of the sugar price in disaster free scenario" but more justification for using this modelling approach is required.

A: We find that it is quite difficult to place the part of applying the autoregressive error model properly. As you know, the aim of this paper is to assess economic impacts and compare them among different economic bodies. The model here is a supportive tool of obtaining sugar price in non-disaster scenario and we think that it is not such proper to place it in introduction because those in introduction are directly and closely connected to the aim and focus of this paper.

We really agree that more justification for using this modelling approach should be made when using it. This method is quite commonly used in field of medicine and hygiene but seldom in assessing economic impacts. Therefore, in order to show more about its core and application, the autoregressive error model should be introduced in details. We will add these information of model in new manuscript when mention it.

Q: Globally, I recommend to the authors to better situate their contribution in the literature of the economic evaluation of natural hazard.

A: We agree that this comment is such inspiring. When we started to do this research, the aim of it is just to rise the problems in reality and stimulate more discussions in this topic, and therefore we lack such thinking of situating contribution in the literature. We will add it later.

Q: I do not understand why the authors refer to CBA. Afterwards, no link is done with CBA. Either the link they make should be explained, either they should not mention it.

A: After rethinking of our paper, we agree that CBA is not necessary to be mentioned in this

paper and we will delete this term.

Q: In this section, it is not clear if some other sugar companies exist in the case study area. And if not, authors should explain what are the 20% of sugarcane growers doing with their production.

A: Jinke Group is the largest company in this region which account for nearly 80% of market share. At the same time, there are several small enterprises that produce sugar but they are relatively weak in comparison with Jinke. About 80% of sugarcane growers intend to have contract with Jinke because that its finance is always running quite well and it can provide better helps in planting technology when growers need. What' more, Jinke has good connections with local government and growers are easier to trust it because growers may think local government is the invisible guarantee of Jinke and it is less risky to cooperate with Jinke. Those 20% growers who do not have contract with Jinke will find their buyers by themselves, like selling to small companies or transporting their products to sell in other neighboring counties.

Q: Moreover, the authors do not give information on the sugar market (internal, exportation...). This aspect is crucial to have a better idea of the impact of local drought on the market price of sugar. The terms of the contract between the farmers and sugar industry should be detailed to better understand the propagation of drought consequences through the chain.

A: We agree that such details should be added. We will try to search information about local sugar market and terms of contract and fulfill them in our paper.

Q: The term of "order performance rate" should be already mentioned in the section of background and better explained. P_{order} is introduced in the equation (2) but has been hardly discussed before although it is a critical parameter. I recommend to the author to further detail how this price is fixed.

A: We feel sorry that we did not explain those terms well. The term of order performance rate is the proportion of growers who fulfill the farming contracts in those growers who sign farming contracts when this planting season begins. The term of P_{order} is the sugarcane purchasing price that sets in farming contract. It means that the sugar company will buy those sugarcanes from growers in this price after harvesting. We will make the above two terms clearer in new manuscript.

In practice, the P_{order} is mainly decided by the local government which, to some extends, comes from the sugar price in past years and the predictions of future sugar markets by officials' experiences. Before the great drought in 2009, the local system of contract farming had little experience of natural disaster risks and therefore it did not take price variation in disaster scenario into considerations.

Q: It should be better explained why fixed costs for growers are yield dependent while fixed costs for the industry are really fixed.

A: When planting sugarcanes, the fixed cost mainly refers to the cost of buying seeds of sugarcanes and the cost of transporting seeds to the fields and planting them, and the marginal cost refers to the cost of cultivating and maintaining the life of sugarcanes like using fertilizers. This way of dividing costs is mainly based on the perspective of disasters because the fixed cost is independent from disasters and marginal cost is not.

Q: Finally, the most important aspect for me is that the parameters considered by the authors are fixed. Given the uncertainty the authors mention in introduction, this analysis should be supplemented by a sensitivity analysis. In particular, this would enable to study the influence of parameters such as P_{order} , $P_{sugar-non}$ and $P_{sugar-disa}$

A: $P_{sugar-non}$ and $P_{sugar-disa}$ are those parameters directly related to natural disaster itself. To have different values and make sensitivity analysis of these two parameters means that the model in this paper will run in background of other droughts. Unfortunately, the starting point of this research is to reveal the phenomenon of economic inequality between economic bodies in contract farming with the background of this catastrophic droughts and hence we did not investigate other droughts in field works. Without data like costs in other droughts, it is unable to run the model in this paper. Therefore, because of the limitation of data, we feel sorry that we are not able to finish sensitivity analysis of $P_{sugar-non}$ and $P_{sugar-disa}$. We believe that this is a good idea and it will help to improve our model design in further research.

As for P_{order} , we think that we are capable to finish a sensitivity analysis of it. For P_{order} represents the sugarcane purchasing price which sets in farming contract, it is an outcome of human economic cooperation and quite “artificial” comparing with $P_{sugar-non}$ and $P_{sugar-disa}$. In our new version of paper, we agree to add sensitivity analysis of P_{order} . By assuming different values for P_{order} , we can compare economic impacts on growers and company, which helps to reveal the importance of this parameter in balancing interests of growers and company when disaster hits.