We sincerely appreciate the reviewer's suggestions, which have greatly improved our article. Our responses are organized into two categories: responses to specific comments and responses to technical comments.

Responses to specific comments:

We appreciate the reviewer's suggestions regarding data sources. Indeed, the Ming Shilu is a valuable document for studying the imperial court's response during the drought events. We have collected data on relief efforts (赈济) from the Ming Shilu for the two drought events and conducted preliminary analyses. However, the conclusions were not relevant to the main arguments of this article, and there was insufficient historical evidence to support them further.

We also examined the records of tax exemptions for the two drought events in the Ming Shilu, but due to differences in textual record, it was not possible to compare changes in the intensity of tax exemptions between the two drought events. Therefore, we did not use data from the Ming Shilu in our study. We will clarify these in the data sources section of the manuscript.

Below are the conclusions on relief efforts that were not presented in our manuscript and the tax exemption records:

During data collection, we extracted a total of 40 records regarding relief efforts from Volume 236-285 of Ming XianZong Shi Lu and Volume 157-206 of Ming ShenZong Shi Lu about Chenghua Drought (1483-1486 CE) and Wanli Drought (1585-1588 CE). Additionally, we have conducted some preliminary analyze. The results were as follows:

The Ming Dynasty mainly took two forms of relief: grain and silver. During the two drought events, grain relief and silver relief had obvious changes in quantity. During the Chenghua Drought, relief were predominantly in the form of grain, amounting to 1.42 million Dan. In contrast, during the Wanli Drought, grain relief decreased to approximately 0.82 million dan. Silver relief, on the other hand, showed a marked increase—from 520 thousand taels during the Chenghua Drought to 1.42 million taels during the Wanli Drought.

Based on the grain price of 2 taels per Dan in famine years (Chen, 2016), we conducted a preliminary estimation of the proportion of relief silver received by each province during the two drought periods (Table 1). It was evident that the proportion of receiving silver had increased significantly. From the Chenghua Drought to the Wanli Drought, the status of silver relief became prominently prominent.

Table 1: The proportion of relief silver (converted into grain) received by the five northern provinces during the two droughts.

	Beizhili	**Shandong**	**Shanxi**	**Henan**	**Shaanxi**
Chenghua Drought	0%	4%	23%	16%	14%
Wanli Drought	35%	19%	75%	18%	87%

Silver relief possessed its own advantages compared to other relief methods such as grain relief. During large-scale natural disasters, when numerous famine-stricken people required assistance, providing relief grain would necessitate a large quantity of food to be transported from areas with abundant supplies to the affected regions. This process involved immense manpower, resources, and

exorbitant transportation costs. Additionally, due to inconvenient transportation means, relying on carts, horses, and ships at that time, it took a substantial amount of time for the grain to reach the disaster-stricken areas, risking missing the optimal relief timing. In contrast, silver relief effectively addressed these challenges. Silver had higher value and smaller volume, making it easier to store, carry, and transport. By issuing silver to suitable recipients based on the severity of disaster and the actual situation of famine-stricken individuals, silver could be allocated towards those not severely affected. Those could use silver to purchase grains or other essential commodities from surrounding areas, thereby alleviating the pressure on food supply in the affected regions (Huang, 2014) and subsequently mitigating famine. However, in the case of extreme drought events, when food supplies in the affected areas were exhausted, there was often a situation where grain was unavailable for purchase despite having money. Whether silver relief could still exert its advantages in such circumstances requires further historical evidence.

Based on the data we collected, no historical records indicate that the form of relief significantly impacted the effectiveness of famine responses during the Chenghua and Wanli droughts. Assessing the efficiency of disaster relief efforts requires more data, which we were unable to fully address in this study.

Secondly, when collecting data on tax exemptions, there is a significant difference between the records of exemptions during the Chenghua and Wanli reigns in Ming Shi Lu. The records from the Chenghua period include details such as location, type of disaster, and quantities, for example,

"Due to drought, autumn grain and grass tax of last year in Datong, Shanxi and other prefectures were exempted, amounting to more than 2.3 million Dan of grain and more than 4.34 million bundles of grass."
(以旱灾免山西大同等府卫去年秋粮子粒二十三万余石马草四十三万四千余束)

In contrast, the records from the Wanli period are less specific regarding quantities, for example

"The decree ordered that the tax could be exempted at varying levels for the disaster-stricken populations in Shaanxi and Shanxi"
(诏狭西山西被灾民屯钱粮蠲折有差)

It is quite challenging to compare the magnitude of tax exemptions between the two drought events. Therefore, for the reasons mentioned above, we have chosen not to include data from the Ming Shi Lu in this study. We will provide an explanation in the paper

Responses to technical comments:
We are very grateful for your insightful technical comments, which have significantly contributed to the rigor of this manuscript. In response to your valuable feedback, we will ensure that the necessary references are added, revisions are made, and supplementary annotations are incorporated at the relevant points within the article. As for the American crops you mentioned, more researches (He, 1979; You, 1989; Wang, 2004) have led us to recognize that we had overstated their influence

on the northern regions during the Wanli Drought. As a result, we have decided to remove the section discussing American crops to maintain the accuracy and integrity of our analysis.