Reconstruction of the distribution rules of the burden of proof on the causality of environmental tort of toxic and hazardous substances

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Abstract. The forensic toxicology mainly focus on the determination of the biological damage relationship of external factors through scientific methods. The causation of environmental tort of toxic and harmful substances is on the polluters. However, some judicial practices deviate from the legislative logic. In this study, the contact causality and injury causality, as well as the classification of general causality and specific causality were analysed and discussed. In the result, in the case of scientific uncertainty, the burden of proof of general causality should be assigned to the polluter; in the case of scientific certainty, the burden of proof should be assigned to the injured party. In addition, the burden of proof of specific causality should also be assigned to polluters. This paper is expected to provide a reference for the related research.

1. Introduction

The current legislative system of China stipulates that the burden of proof for the causation of environmental tort cases involving the toxic and hazardous substances should be on the polluters, instead of the injured party who claims causation. Back in the year 2002, the Provisions of the Supreme People’s Court on Evidence in Civil Procedures already stipulated the principles of reversal of burden of proof. It is later reiterated by Article 66 of the Tort Liability Law of the People's Republic of China issued in 2009 and Article 1230 of the Civil Code of the People’s Republic of China issued in 2020.

However, in recent years, a considerable proportion of judicial documents on environmental tort cases did not adopt this principle when determining causation [1]. According to an analysis of 782 judgments of civil environmental tort cases, scholars found that only 49.6% of the cases actually adopted reversal of burden of proof. Apart from the factors such as judges’ capability of applying the law, the deviation of rational thinking in practice from legislative logic is another important factor.

There is a need for the legislative system to reconsider the “one-size-fits-all” rule of the burden of proof for environmental tort. The causation in environmental tort cases involving toxic and hazardous substances, compared to the causation in cases involving involving noise, vibration and optical radiation, may seem more complicated and more difficult to determine in the judicial process, which thus should be given more attention in legal research.
2. Materials and methods

2.1. Preconditions

The reversal of the burden of proof for causation in environmental tort cases stipulated by China’s tort laws, is mainly based on the following considerations.

First, the behavior that causes environmental pollution is complex and evolutionary in nature and is followed by latent and extensive injury. The causation in such cases is more complicated than that in ordinary tort cases. If the burden of proof is on the injured party, the injured party will find it difficult to defend its rights, which will lead to rising social tensions and disputes.

Second, to decide the causation of environmental torts, especially of those involving toxic and hazardous substances, requires strong backgrounds in specialized knowledge. The polluter, compared to the injury party, is in a dominant position and more likely to obtain key information such as pollutant discharge and environmental risks. Moreover, as polluters gain benefits from pollutant discharge, they should bear the risks caused thereby. The injured party is in a disadvantaged position, so their burden of proof should be reduced. Thus, the burden of proof for the causation between the behavior and consequence of pollution needs to be borne by the polluter.

2.2. Methods

In Anglo-American tort laws, the discussion on causation in cases of scientific uncertainty of toxic torts is divided into general and specific causation. China’s tort laws can draw lessons from this dichotomy. General causation refers to the possibility of a substance leading to injury in a general sense. It mainly deals with the issues that can be solved with general scientific knowledge. The discussion of specific causation should be under the precondition that general causation has been determined. The factual causation in a specific case has been established, that is to say, a certain degree of exposure to the substance has in fact caused the plaintiff’s injury in the case.

Specific causation emerges when discharged toxic and hazardous substances come into the contact with the polluted receptor and cause actual injury. Specific causation can be determined in two aspects: contact causation and injury causation. Contact causation refers to the stage of specific causation where the discharged toxic and hazardous substances come into contact with the polluted receptors, dealing with the problem of whether the toxic and hazardous substances are at the site of injury and whether they have an effect on the receptor exposed to them. Since contact causation needs to be discussed case by case, it is categorized under specific causation. According to the General Technical Guidelines for The Identification and Assessment of Ecological and Environmental Damage issued by the Ministry of Ecology and Environment in 2016, when conducting analysis of contact causation, one should mainly consider the homology of environmental pollutants (pollution sources, environmental pathways, and organisms), valid pollutant transport, and possible receptor exposure. Injury causation refers to the stage of causation where exposure to toxic and hazardous substances leads to injury, which deals with the problem of whether the injury is caused by the toxic and hazardous substances discharged by the polluter. Injury causation is a type of a specific causation which emphasizes the happening of specific injury in a specific case; however, in the judicial process of a lot of specific cases, after contact causation is established, general causation will instead be proved for the establishment of injury causation (Fig. 1).

![Figure 1. Causation between discharge of toxic and hazardous substances and injury](image-url)
3. Results and discussion

3.1. The distribution of the burden of proof in contact causation
Contact causation is the most basic causation in torts involving toxic and hazardous substances. It does not involve specialized knowledge in the general sense, but needs to be supported by specific evidence in specific cases. It will be highly inappropriate to place the burden of proof for causation entirely on the polluter and remove all burden of the injury party. There are two reasons: First, in an environmental tort case involving toxic and hazardous substances, the litigation is initiated by the injured party. To avoid litigation abuse, the injured party should provide the court with preliminary evidence to facilitate the establishment of causation when suing. Second, in general, the basic evidence of causation is usually provided by the injured party and may lack necessary specialized knowledge, and therefore the aforementioned considerations to place the burden of proof on the polluter may not exist at all. Therefore, it is necessary to assign the injured party burden of proof to some extent when determining contact causation.

We can invoke the theory of indirect disproof to explain the distribution of the burden of proof in contact causation. Indirect disproof theory was adopted in the case of Niigata Minamata disease to reduce the difficulty for the plaintiff to provide evidence, which has great influence on later court decisions for decades [2]. Indirect disproof theory means that if the plaintiff can prove some events in the chain of causation, the rest will be presumed as facts and thus the causation will be hypothetically established [3]. Then the polluter will need to provide evidence to reject the hypothesis. If the defendant cannot reject the hypothesis, it will be determined that such causation exists. Such distribution system of the burden of proof for contact causation developed based on the indirect disproof theory can be applied to the current China’s tort cases involving toxic and hazardous substances. Although according to Article 1230 of the Civil Code of the People’s Republic of China, the burden of proof for causation in environmental torts is assigned to the polluter, Article 6 of the Interpretations of Several Issues Concerning Applicable Laws in the Trial of Environmental Tort Cases issued by the Supreme People’s Court stipulates the obligation of the injured party to provide evidence to prove the “relevance between the primary or secondary pollutants brought by the polluter and the injury caused”.

To sum up, the preliminary burden of proof for the causation in environmental torts involving toxic and hazardous substances should be assigned to the injured party, but the ultimate burden of proof should still be borne by the polluter. The preliminary burden of proof should not be unduly heavy for the injured party, and should differ from case to case. For example, in gas exhaust torts, where the injured party provides evidence of the physical distance between him/her and the polluter and basic information of the exhaust emitted by the polluter; while in a sewage tort, the injured party should prove that he/she stays downstream from the river where the polluter discharges the sewage.

In addition, although contact causation is a precondition in the establishment of the causation in torts involving toxic and hazardous substances and the polluter should bear the ultimate burden of proof, the polluter’s evidence of contact causation may influence the overall causation. By reasoning forwards, Contact causation and injury causation constitute the complete causation of a tort involving toxic and hazardous substances. However, by reasoning backwards, when contact causation is rejected, the overall causation is rejected as well, and there is no need to prove the injury causation anymore.

3.2. Distribution rules of the burden of proof for general causation
According to the sophistication level of scientific knowledge, when discussing general causation, the torts involving toxic and hazardous substances can be roughly divided into two types: the cases of scientific certainty and the cases of scientific uncertainty. The cases of scientific certainty can be divided into the cases relying on common-sense identification and those on expert-opinion identification. The general causation of cases relying on common-sense identification can be determined by existing scientific knowledge and the common sense of the general public. For example, because of the mine waste dump in a corn field, the corn there grows significantly more slowly than the healthy corn planted in adjacent fields. Common sense can be used to determine injury causation. The evidence does not
require specialized knowledge to establish general causation, and therefore, there is no need to reverse the burden of proof which should just be borne by the injured party. In the case of environmental liability dispute between Hengda Coal Mining of Fuxin Mining Group and Zhang Dongtao, the waste discharge of Hengda Coal Mining was determined to be the immediate cause of the death of the fish in Zhang Dongtao’s fish pond. It is a judgment based on common sense made by the judge. Cases that rely on expert opinions for judgment can already be solved with knowledge in existing scientific fields, but these expert opinions are usually difficult for the general public to understand [4]. General causation in such cases relies on judicial expertise or expert advisers’ opinions, which can enable the judge to acquire sufficient judicial cognition. Therefore, the burden of proof of general causation in such cases does not need to be borne by the polluter and can instead be determined by the judicial appraisal requested by the injured party.

In recent years, China’s Ministry of Ecology and Environment, together with the National Health Commission, has drawn up the List of Toxic and Hazardous Water Pollutants (The First Batch) and the List of Toxic and Hazardous Air Pollutants (2018). Both Lists are aimed at cases of scientific certainty and provide direct proof for the general causation in torts involving toxic and hazardous substances.

Compared with the cases of scientific certainty, it is more difficult to identify the general causation in the cases of scientific uncertainty, which reflects the inevitable limitations of current science and technology. Such cases are characterized by the lack of consensus or widely agreed opinion in the related scientific community and the controversy in academia on the general causation. The proof of general causation in cases of scientific uncertainty is very difficult for both the polluter and the injured party. It is difficult for the injured party to prove the causation. The polluter can neither completely disprove the causation. The polluter who causes such torts is usually in an advantaged position relative to the injured party, both in terms of scientific expertise and the ability to present evidence. Placing the burden of proof of general causation on the polluter is therefore a relatively reasonable decision.

3.3. The distribution rules of the burden of proof for specific causation

By logical order, general causation is the precondition of specific causation when deciding the injury causation of a tort involving toxic and hazardous substances. If general causation is not established, specific causation cannot be established; it is only after the establishment of general causation that there is a need to continue to prove specific causation in the case. The followings are several widely adopted theories across the world that interpret the burden of proof and standards of proof for specific causation.

First, the theory of dominant evidence. According to this theory, in civil lawsuits of environmental torts, the plaintiff can win the case as long as the probability of injury caused by the defendant’s behavior is more than 50%. If, on the other hand, a defendant can convince the judge or jury that his/her behavior has less than a 50% chance of causing environmental damage, the defendant will not have to pay damages. The application of this theory is quite common in the trial practice of the U.K., the U.S., etc.

Second, the theory of disease causation. It is a novel theory to identify the causation between environmental tort and injury through epidemiological methods. Good judgment on disease causation requires three critical factors. First, the pollutant plays a role in the onset of the disease. Second, an increase in the number of the pollutant will lead to more patients or worsened disease, while a decrease in the number of the pollutant will lead to a decrease in the number of patients or recovery from the disease. The number of the pollutant and the number of patients/seriousness of illness are directly proportional. Third, biological expertise does not reject the possibility that the pollutant is capable of causing the disease. If, with the help of quantitative statistical analysis, the above interrelated factors are deemed reasonable, they can be used as proof without rigorous scientific experiments. This theory has been given lots of attention in the judicial practice of Japan. However, the disease causation theory has a limit since it is only applicable when an illness is caused by environmental torts, and not so under other circumstances of environmental torts.

Third, the theory of tentative presumption. If, according to the daily experience of the public, the occurrence of incident A is in most cases attributed to incident B, the tentative presumption that incident B is the cause of incident A can be made due to its high probability based on a rule of thumb. If the
presumption is to be overturned, the party denying the causation must make an explanation of the exceptional circumstance. This theory is popular in German law.

The tentative presumption theory can adapt itself well to China’s judicial practice. The burden of proof for general causation may vary, depending on if the case is of scientific certainty or not. However, when general causation is proved, the tentative presumption of specific causation in the case can be made. That is to say, specific causation is presumably established. Then the party who denies the specific causation should provide evidence to disprove the causation. In other words, the polluter should bear the burden of proof for the specific causation induced by toxic and hazardous substances.

4. Conclusions
In order to distribute the burden of proof for causation in environmental torts involving toxic and hazardous substances in a scientific and rational fashion, it is necessary to make careful analysis of different types of causation. In recent years, the simple and crude stipulations about causation in Chinese law has led to predicaments in judicial practice, but active exploration has also been made in some cases. Academic research should quickly follow as well. By identifying the types of causation in theory, this paper intends to reconstitute the distribution rules of burden of proof to provide insights for the legislative and judicial practice of environmental torts involving toxic and hazardous substances.

Acknowledgement
This work was supported by the National Social Science Fund General Project (No. 16BFX066) titled “A Study on the Systematic Reform of the Judges’ Posts”.

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