

# ***Framing Fukushima Discharge Water: A Cross-Cultural Analysis of Media Narratives in China and Japan***

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**Abstract:** Japan's decision to discharge wastewater from the Fukushima nuclear plant has generated wide international concern and debate. This study applies Zang Guoren's three-level framing theory to conduct a comparative content analysis of *China Daily* and *The Japan Times* between 2021 and 2024. Using systematically retrieved reports, the analysis examines macro-level frames, meso-level frames, and micro-level frames. Findings indicate significant cross-cultural differences: Chinese media consistently emphasize ecological risks and governmental responsibility, adopting a strongly critical tone that aligns with diplomatic positioning, while Japanese media highlight international relations and technical legitimacy, distributing responsibility across multiple actors and employing more neutral, technocratic language. Temporal comparison further reveals dynamic shifts in reporting strategies as the event progressed, with Chinese coverage moving from outright opposition to monitoring and oversight, and Japanese coverage shifting from preparation to explanatory justification. These results demonstrate how national interests shape media framing, risk discourse, and asymmetrical international communication.

## **1. Introduction**

With the growing global attention to environmental issues, the Japanese government's decision to discharge wastewater from the Fukushima nuclear power plant accident into the ocean has attracted significant international concern and controversy. In this process, traditional mainstream media, relying on authoritative sources and professional reporting frameworks, have dominated the competition for discursive power in risk communication and profoundly shaped the cognitive schema of public risk perception as well as the collective mobilization of social emotions. This study employs content analysis to compare reports from *China Daily* and *The Japan Times* on the Fukushima wastewater discharge, applying Zang Guoren's model of macro-level, meso-level, and micro-level frames to examine how different national media frame the issue in terms of topic selection, emotional tendency, stakeholders, responsibility attribution and so on, and how these frames reflect media stances and reporting strategies.

## 2. Literature Review

### 2.1. The Origins and Development of Framing Theory

Erving Goffman (1974) first introduced the concept of the “frame,” referring to the cognitive structures through which individuals organize experiences and make sense of reality. He emphasized that frames are not explicit systems, but rather habitual cognitive constructions that guide how people understand the world [1]. Building on this foundation, Robert Entman incorporated framing into communication studies and proposed a four-function model: problem definition, causal attribution, moral evaluation, and treatment recommendation. This framework laid the foundation for modern framing theory in communication research [2].

On this basis, Taiwanese scholar Zang Guoren developed the three-level model of news framing. Macro-level frames correspond to the overall themes and central issues of reporting. Meso-level frames include key event developments, causes and consequences, historical context, effects, and attribution of responsibility. Micro-level frames are reflected in the lexical, syntactic, and rhetorical choices made by the media [3]. This tripartite model provides the present study with an analytical perspective that moves from the macro to the micro level, allowing a distinction between different framing features ranging from overall topic selection to specific linguistic choices. Applying this model through content analysis enables a systematic examination of the thematic structures, discursive orientations, and implied viewpoints in the coverage of *China Daily* and *The Japan Times*.

### 2.2. Comparative Analysis of Chinese and Japanese Media in the Context of Environmental Communication

As environmental issues have become a global concern, research on environmental communication has accelerated in recent years [4]. As a subfield of communication studies, environmental communication has developed considerably over the past four decades. The frequent occurrence of major environmental events, along with the transformation of the media ecology, has increasingly drawn public attention to risk-related issues and expressions [5]. The introduction of new concepts such as “risk society” and “environmental justice” has provided novel perspectives that enrich scholarly understanding of how environmental risk information is presented and how it is perceived by audiences [4]. At the same time, Chinese scholars have increasingly focused on the mechanisms of communication in specific environmental risk events. Topics such as climate change and pollution accidents have expanded the thematic scope of risk communication research [6]. Empirical studies on the Fukushima wastewater discharge demonstrate that negative emotions, risk literacy, and patterns of media exposure significantly affect public risk perception, highlighting the multiple mediating mechanisms of environmental risk communication [7]. From an international perspective, Massa and Comunello find that current natural and environmental risk communication practices concentrate primarily on the prevention stage of risks, emphasizing the need for participatory and co-creative communication tools tailored to different audience groups [8]. In addition, Huang and Bu, drawing on the Social Amplification of Risk Framework, show that Chinese citizens’ climate change risk perceptions are significantly enhanced by diverse information exposure on social media and connections with environmental experts [9]. Overall, recent scholarship on environmental risk communication has emphasized both localized theoretical innovation and the mechanisms of audience cognition and opinion formation in a rapidly evolving media environment.

Media in different national contexts often construct divergent or convergent frames according to prevailing social values and political positions. In the case of China and Japan, such differences are

particularly evident. In a comparative analysis of *China Daily* (representing Chinese mainstream media) and *The Japan News* (an English-language Japanese outlet), found that Chinese media coverage emphasized environmental security and international cooperation, portraying China as a “responsible great power,” with discourse highlighting national interests and ecological safety. Japanese media, in contrast, tended to situate the issue within the broader context of geopolitics and economic diplomacy, underscoring the diplomatic and economic significance of the agreement [10]. Other studies have also noted differences in public attitudes toward nuclear safety and media trust between China and Japan, which are likely to be reflected in news frames. For instance, Japanese media often cite expert opinions, whereas Chinese media are more likely to emphasize government positions and public sentiment [11].

Although the Fukushima wastewater discharge has generated extensive scholarship in legal, technical, and environmental science domains, research from a communication perspective remains relatively limited. Existing studies in communication tend to focus on public risk perceptions and attitudes, while comparatively little attention has been given to how mainstream media construct public discourse on this issue through topic selection and discursive strategies. In the context of China-Japan comparison, there is still a lack of longitudinal content analysis that reveals similarities and differences in different levels of frames. This study aims to address this gap by systematically examining how Chinese and Japanese media construct frames in their coverage of the Fukushima wastewater discharge. Drawing on perspectives from both cross-cultural communication and risk communication, it seeks to uncover national discursive differences in environmental communication and to contribute to understanding how media discourse shapes public risk perception and collective emotions.

### 3. Research Methods and Case Selection

This study employs content analysis in combination with Zang Guoren’s three-level framing theory to examine how *China Daily* and *The Japan Times* reported on the Fukushima wastewater discharge across different time periods. The coding process was independently conducted by two trained coders, and inter-coder reliability was ensured with a Cohen’s Kappa coefficient of 0.9. A pilot coding was performed to refine the coding framework, and representative sampling across time was applied to enhance both reliability and validity.

Reports were retrieved from the two newspapers using the keywords “nuclear water,” “radioactive water,” “Fukushima water,” and “contaminated water.” The study covers the period from April 9, 2021 (The Japanese government finalizes the policy for the discharge of Fukushima water), to September 20, 2024 (China and Japan reach a consensus on the issue of discharging Fukushima water). In total, 742 reports from *China Daily* and 384 reports from *The Japan Times* were initially collected. After excluding irrelevant and inaccessible reports, 424 valid reports from *China Daily* and 139 valid reports from *The Japan Times* remained, resulting in a dataset of 563 reports. These were then divided into three time periods (Table 1) for analysis based on the progress of the discharge event.

Table 1 Division of News Reporting Time Periods.

Time Period	Report Content
April 9, 2021 to January 12, 2023	Initial reports after the Japanese government finalized its Fukushima water discharge policy
January 13, 2023 to August 23, 2023	News reports after the Japanese government officially announced its decision to discharge Fukushima water into the sea
August 24, 2023 to September 20, 2024	News reports after the Japanese government began the actual discharge of Fukushima water

The macro-level frames in this study include News themes and emotional tendency, which

reflect the core issues selected by the media and their attitudes toward the discharge. The meso-level frames involve stakeholders, responsibility attribution, consequences, and sources of information. The micro-level frames focus on frequently used words and headline characteristics. By analyzing recurrent vocabulary and linguistic styles, the study uncovers how the media employed emotional guidance and discursive strategies in framing the event. The details are shown in Table 2.

Table 2 Division of News Frames by Levels

Coding Dimension	Design Category	Specific Content	Description
Macro-level	News Theme	Ecological Risk	Potential impact on the environment and threats to human health
		International Relations	Diplomatic interactions and relationship dynamics between relevant countries
		Social Impact	Attitudes and behaviors of the public inside and outside Japan
		Policy Direction	Decisions and reactions of governments and authoritative organizations and institutions
		Technical Assessment	Evaluation of the technical rigor of the sea discharge process
	Emotional Tendency	Positive	Emotional attitude of the report towards the event itself
		Neutral	
		Negative	
Meso-level	Stakeholders	Japanese Fishermen and Fishery Industry	Core interest groups concerned in the report
		Other Industries in Japan	
		Japanese Consumers and Public	
		Japanese Government	
		International Community (Other Countries' Governments and International Organizations)	
		Environmental Organizations and Experts	
	Responsibility Attribution	Not Mentioned	Identification of the responsible party in the event by the report
		Japanese Government	
		Tokyo Electric Power Company	
		International Community	
		Scientific Community and Experts	
	Outcome Impact	Not Mentioned	Direct or indirect consequences caused by the event
		Ecological and Public Health Impact	
		Socio-economic Impact	
		International Political and Diplomatic Impact	
	Information Source	Single Source	Sources of news and evidence cited in the report
		Multiple Sources	
Micro-level	High-frequency Words		The most frequently appearing words
	Title Features		Language style and expression of the report title

## 4. Results and Discussion

### 4.1. Differences in Framing across Levels

Overall, the three-level frames employed by Chinese and Japanese media in reporting on the Fukushima wastewater discharge reveal significant differences. At the macro-level, the two media outlets displayed distinct variations in topic selection and emotional tendency. *China Daily* focused heavily on Ecological Risk (44.55%), consistently prioritizing threats to the environment and public health across all stages, with an overwhelmingly Negative tone (90.8%). This pattern clearly reflected the value orientation and agenda priorities of Chinese media. In contrast, *The Japan Times* emphasized International Relations (40.58%) and Social Impact (28.99%), with Ecological Risk accounting for only 6.52%. Its reporting tone was comparatively moderate, with 54.35% Negative, 42.03% Neutral, and 3.62% Positive, presenting international public opinion and technical compliance in a more balanced manner.

At the meso-level, both outlets highlighted the Japanese Government as the core Stakeholder and primary agent of Responsibility Attribution, yet they framed it differently. In *China Daily*, 72.82% of reports attributed responsibility directly to the Japanese Government, often in parallel with the International Community (30.36%), highlighting an international consensus that placed pressure on the Japanese Government. In *The Japan Times*, responsibility was more dispersed across the Japanese Government (58.06%), Tokyo Electric Power Company (22.58%), and the International Community (28.41%), underscoring multi-party involvement and complexity. In terms of Outcome Impact, *China Daily* emphasized Ecological and Public Health Impact (54.13%), stressing environmental crises and moral critique, whereas *The Japan Times* focused more on International Political and Diplomatic Impact (41.30%) and Socio-economic Impact (34.78%), reflecting attention to diplomatic dynamics and domestic economic concerns. Regarding Information Sources, both relied predominantly on Multiple Sources (85.96% in *China Daily* and 89.86% in *The Japan Times*), though *China Daily* more frequently cited the Ministry of Foreign Affairs and international organizations, while *The Japan Times* cited the IAEA and expert assessments, reinforcing scientific rationality and policy legitimization.

At the micro-level, lexical and headline choices further reinforced discursive differences. *China Daily* frequently employed terms such as “discharge,” “radioactive,” “pollution,” “risk,” and “irresponsible,” intensifying Negative emotions and shaping audience perceptions of crisis and dissatisfaction with the Japanese Government. *The Japan Times*, on the other hand, favored terms such as “treated,” “diluted,” and “meeting standards,” adopting a rational and scientifically compliant narrative that mitigated perceptions of risk.

### 4.2. Evolution of News Reporting Strategies

Analysis across three time periods demonstrates that reporting strategies in both countries evolved dynamically as the event progressed. In the first stage (April 13, 2021-January 12, 2023), coverage centered on the Japanese Government’s decision to initiate the wastewater discharge and the initial international response. Chinese media heavily emphasized Ecological Risk (76.27%), attributed responsibility almost exclusively to the Japanese Government (98.31%), and maintained an extremely Negative tone (96.61%), underscoring the dangers of the discharge and portraying it as a unilateral act. Japanese media highlighted Social Impact (41.67%). Although 75% of reports carried a Negative tone, the narratives focused more on domestic opinion and the feasibility of economic implications. This contrast illustrates the cultural and political roles of media: Chinese outlets amplified concerns about ecological and international consequences in the early discourse, while Japanese outlets employed more neutral technical language to soften criticism and emphasize

favorable evaluations and official responses.

In the second stage (January 13, 2023-August 23, 2023), as the Japanese Government confirmed the discharge schedule and facility construction, opposition and technical debates intensified. Chinese media further reinforced the Ecological Risk frame (72.73%), highlighting opposition from the International Community and Japanese fishermen, constructing an image of global consensus against Japan. Japanese media, meanwhile, shifted primarily toward International Relations (40.00%), stressing IAEA safety endorsements and responses to neighboring countries, while still attributing responsibility mainly to the Japanese Government (61.03%) but increasingly including Tokyo Electric Power Company and international institutions. Reports maintained rational language, emphasized government measures to address the concerns of fisheries and food industries, and exhibited a mix of emotional tendencies: Negative (51.43%), Neutral (42.86%), and Positive (5.71%). This diversity reflected a careful balancing act in the face of domestic and international pressures.

In the third stage (August 24, 2023-September 20, 2024), when the discharge was carried out and subsequent diplomatic interactions unfolded, the process triggered economic countermeasures, public protests, and technical disputes, though consensus between China and Japan gradually increased. Chinese coverage continued to prioritize Ecological Risk (70.59%), adding independent monitoring data and scientific evidence, but maintained a consistently Negative tone exceeding 90%, indicating a stable position. Japanese coverage, however, shifted significantly in tone, with Negative reports rising to 82.76%. Yet the dominant themes remained International Relations (37.93%) and Ecological Risk (17.24%), with a greater emphasis on explaining monitoring mechanisms and outcome evaluations.

Overall, Chinese media reinforced frames of Global Marine Environmental Security and Japanese Government Responsibility, constructing a discourse centered on ecological and moral critique. Japanese media emphasized International Legitimacy and Scientific Compliance, presenting state actions as justified. In terms of emotional tendency, Chinese reporting consistently maintained a strongly Negative orientation (over 94% across all stages), whereas Japanese reporting fluctuated: 75% Negative in the first stage, moderating in the second stage, and increasing again to 82.76% after the actual discharge. Over time, both strategies evolved dynamically: Chinese coverage shifted from “comprehensive opposition” to “supervisory monitoring,” while Japanese coverage moved from “policy preparation” to “explanatory implementation.”

## 5. Conclusion

A comparison across the three stages reveals fundamental differences between Chinese and Japanese media in frame construction, contestation of risk discourse, and asymmetry in international communication. First, national interests played a dominant role in frame selection. Chinese media employed an “Environmental Security Threat” frame to highlight Ecological Risk and International Responsibility, aligning with China’s diplomatic and environmental policy positions. Japanese media adopted a “Scientific Rational Decision-making” frame, stressing technical assessment and compliance, reflecting the Japanese Government’s logic in responding to external scrutiny. Second, the competition for risk discourse exhibited a strong national character: Chinese media leveraged ecological and international issues to occupy the moral high ground, while Japanese media relied on scientific terminology and institutional endorsements to downplay controversy and redirect public attention. Finally, asymmetry in international communication was further manifested through Information Source and Responsibility Attribution: Chinese media relied more on statements from the Ministry of Foreign Affairs and the International Community to strengthen criticism of the Japanese Government, while Japanese media emphasized IAEA and



expert evaluations to reinforce the legitimacy of national policy.

These findings indicate that news frames in global issues are not merely the result of information selection, but discursive practices shaped by the intersection of culture, politics, and national interest, which in turn reshape public perception and participate in constructing international discourse order.

This study also validates the applicability and explanatory power of Zang Guoren's model of macro-level, meso-level, and micro-level frames in cross-national media comparison. The three levels of frames in Chinese and Japanese news reports interact to jointly shape public understanding of the risk event. The application of this framework demonstrates not only how frames shape transnational discursive landscapes, but also how they adjust dynamically over time.

Nevertheless, this study has limitations. The sample was confined to *China Daily* and *The Japan Times*. While representative, this scope does not fully capture the diversity of media ecologies in China and Japan, particularly the voices of social media and local outlets. Moreover, the study focused on news texts and did not directly examine audience risk perceptions or public opinion responses, leaving the dimension of communication effects underexplored. Future research should broaden the scope to include social media, commercial media, and international outlets, enrich comparative perspectives, and further investigate the interactive mechanisms of cross-cultural communication. Examining how media frames interact with governments, the public, and international organizations can deepen understanding of the communicative logic of global environmental risks.

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