MDPI

Public Narrative Analysis for Disaster Resilience Building: Evidence from Morocco Earthquake

Mohammad Reza Yeganegi *[ID] and Nadejda Komendantova [ID]

Cooperation and Transformative Governance Group, Advancing Systems Analysis Program, International Institute for Applied Systems Analysis (IIASA), 2361 Laxenburg, Austria; komendan@iiasa.ac.at
* Correspondence: yeganegi@iiasa.ac.at

Abstract

Building resilience is largely affected by the socioeconomic characteristics of the community as well as the physical and environmental local characteristics. The effectiveness of the adopted policies for resilience building partly relies on considering public concerns and insights. Insights from public narratives can enrich the resilience-building policies by sharing experiences or evidence from past disasters. Furthermore, it reveals priorities and concerns that society is expecting to be addressed. Even if the concerns are triggered by misinformation, addressing them (e.g., by disseminating corrective information) can increase the success of resilience-building policies. Tracing the public narrative over time shows how much people's perspectives have changed after the disaster and how the relief and resilience-building efforts were compatible with society's expectations. This study is aimed at extracting such insights from the public narrative on social media platforms after Morocco's 2023 earthquake.

Keywords: disaster risk management; disaster resilience building; reconstruction policies; social media data mining; public discourse analysis; Morocco's 2023 earthquake

---

1. Introduction

Setting up sustainable policies and adopting effective strategies are cornerstones in urban disaster resilience building. The sustainability of adopted strategies and policies calls for taking into account the local socioeconomic characteristics as well as physical and environmental characteristics [1–3]. The physical and environmental characteristics can be assessed using models for disaster risk assessment [4,5]. Socioeconomic characteristics can be assessed as part of models for disaster risk assessment [6,7]. However, due to the dynamic nature of socioeconomic variables, the feedback from public perception should be taken into account either for updating strategies or for implementing the adopted policies [8]. For instance, the crafting and implementation of disaster risk management strategies under different situations might be different [9,10]. When a disaster occurs, society is usually more concerned with recovery and relief efforts than with strategies for reducing future disaster risk. It does not mean the implementation of disaster risk reduction is not important. The occurrence of the disaster increases society's vulnerability [11–13], uses the existing capacity, and exhausts the resources for recovery and relief plans [14,15]. In this regard, disaster risk reduction can be considered more important, as it is necessary for reducing the impact of future disasters and preventing the socioeconomic system from reaching a breaking point [16–18]. However, the successful implementation of disaster risk reduction policies should also take into account recovery and relief programs [14,15].

Furthermore, the public perception of the priorities and the trade-offs between the disaster recovery plans and disaster risk reduction depends on the news narratives and the expert discussion. If the expert discussion on different priorities does not reach the public discourse, it would not appear in the public opinion about the priorities of post-disaster policies and strategies. As such, it is important to follow the public discussion as well as general media narratives.

The Morocco earthquake on 8 September 2023 was one of the largest disasters in the region and had a very large impact. The disaster's impact included 2901 fatalities, 5530 injuries and approximately 320,000 people who were exposed to the earthquake [19]. The aftermath of the disaster included US $7 billion in estimated economic damage [20]. Shortly after the disaster (on 10th September), the Moroccan government announced their plan for reconstruction that included increasing urban disaster resilience [21]. The plan for increasing urban resilience included increasing infrastructure and building resilience in the reconstruction plans. The reconstruction plans also included securing financing from various sources. Over the past two years, different discussions have arisen regarding reconstruction and resilience building. However, most of the news and media narrative has been shaped on the anniversaries of the disaster, in addition to the short period of time after the disaster. This study aims to extract and analyze public discourse and media narratives regarding the reconstruction and resilience-building plans over time, in order to understand which aspects of the plan have been discussed and what public opinions about the priorities have emerged. These insights help to better understand how the dynamic of public opinion around the recovery and resilience building can be tracked, and provide insights for crafting policies and adopting strategies in the future.

The remainder of this paper is organized as follows: Section 2 provides the theoretical background on the methods used in this study for public discourse analysis. The description of the datasets used in this study and the results of public discourse analysis are given in Section 3. Section 4 is devoted to discussing the results, and Section 5 concludes the discussion.

2. Methodological Background

The public discourse (discussion) analysis, PDA, refs. [8,22,23] is a collective of NLP models used to extract the structure of public discourse from social media posts. The results of this method provide insights into different aspects of the public discourse in the given set of social media posts. Figure 1 shows the steps in the PDA method. The first step in the PDA is to clean the posts and remove the irrelevant ones. In this study, the search queries were fine-tuned to retrieve the most relevant social media posts. Furthermore, a summary of the hashtags was used to identify the irrelevant social media posts. It should be noted that this step is aimed at increasing the efficiency of later steps in PDA, and if some irrelevant posts remain in the dataset, the PDA will separate them in the later steps as a different sub-discussion [8].

The second step is to use language models to extract key phrases in the social media posts. In this study, a pre-trained language model provided as part of Microsoft Azure Text Analysis [24] is used to extract the key phrases. Once the key phrases are extracted, the key-phrase network is built. The size of the nodes in key-phrase networks shows the relative frequency of the specific phrase appearing in different social media posts [8]. The size of the network's edges shows the relative frequency of two nodes appearing in the same document (each document is a social media post or a sentence in the text). The key-phrase network shows how the key phrases were connected in the public discourse, based on their co-appearance in the same content. For example, if the phrases "unjust" and "fund management" are used in the same social media post, the two phrases (two nodes in the

key-phrase network) will be connected in the key-phrase network. The connection shows a specific aspect of the discussion (in this example, this social media post is concerned about "fund management" from an ethical or social perspective). Alternatively, if the phrases "fraud" and "fund management" appear in a social media post, it indicates that the post is expressing more formal (e.g., legal or official) concerns or accusations. If a social media post uses these three phrases, it will form a triangle in the key-phrase network, expressing both the ethical and legal perspectives in fund management. As such, different combinations of connections among key phrases can reveal different aspects of public discourse. If a particular combination of connections among key phrases appears frequently in social media posts, it can create a sub-discussion (sub-narrative) that highlights a specific aspect of the main topic (e.g., one sub-discussion is focused on the ethical perspective while the other one is focused on the legal perspective).
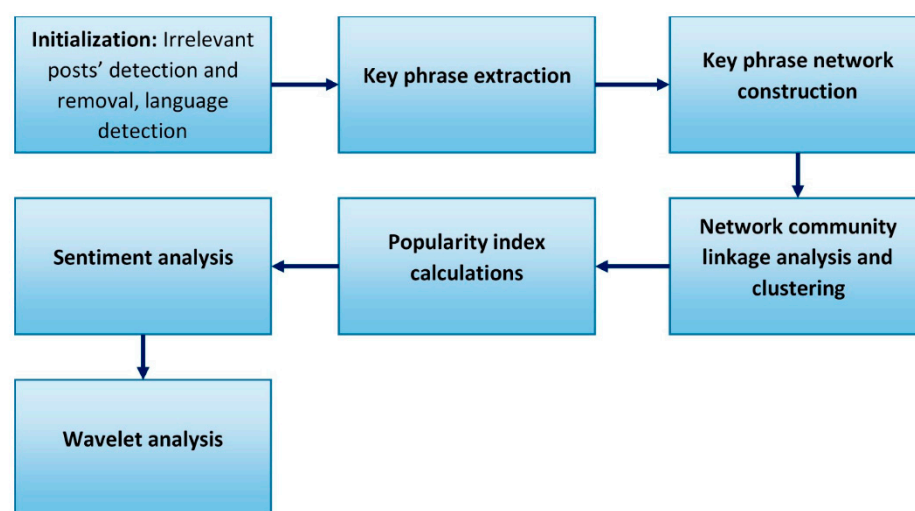

Figure 1. PDA conceptual model [8].

Using the key-phrase network, the structure of the public discourse is extracted using the cluster analysis. The cluster analysis extracts sub-networks with the highest linkage density inside each of the sub-networks. As such, the number of sub-discussions is not predetermined and will be estimated based on the structure of key-phrase networks [8,23]. In other words, the sub-networks show which combinations of connections among key phrases have a higher frequency. As explained before, the high frequency of these combinations can reveal different aspects of the public discourse.

Suppose $e_{i,k}$ is the edge between nodes i and k in the key-phrase network. In order to cluster the edges between keywords, following the edge similarity measures [25,26], the similarity of edges in this network is defined as follows:

$$S\left(e_{i,k}, e_{j,k}\right) = \frac{r_i \cdot r_j}{|r_i|^2 + |r_j|^2 - r_i \cdot r_j}, \tag{1}$$

where r_i is the vector of the relative frequency of edges between node k_i and all the nodes in the first-order neighborhood shared by nodes k_i and k_j. The relative frequency of an edge between two keywords is the number of co-appearances of the two keywords relative to all the co-appearances in the dataset. The initial clusters in the hierarchical clustering of edges are the singleton clusters (each edge is a cluster). In each step, two clusters with the largest similarity between their edges are merged. The number of clusters is determined by

maximizing the weighted average density of clusters. Equation (2) calculates the weighted average density of clusters:

$$D^N = \frac{2}{M} \sum_{c=1}^{N} \frac{m_c^2}{n_c(n_c - 1)} \tag{2}$$

where N is the number of clusters, D^N is the weighted average density of clusters, M is the total number of edges in the key-phrase network, m_c is the number of edges in cluster c, and n_c is the number of nodes in cluster c.

Once the clusters in the key-phrase network are determined, the social media posts in each cluster form a sub-discussion [8]. Since the clustering is based on the linkage among key phrases rather than the key phrases themselves, one key phrase can belong to multiple clusters. Furthermore, as each social media post can contain different key phrases and linkages among them, they can also be part of different sub-discussions.

The summary of social media posts in a sub-discussion shows the narrative in a specific sub-discussion. In this study LLM-based summarization is employed to summarize the sub-discussions [8,22]. It should be noted that other text summarization models can be used for summarizing the sub-discussions (see [27,28] for more details on alternative text summarization models).

The rest of the steps in PDA are focused on tracking the popularity of each sub-discussion over time and the linkage among them. These steps require a huge amount of social media posts [8]. In other words, these are applicable for the topics that are being vastly discussed on social media. As explained in Section 3, the number of social media posts discussing Morocco's reconstruction and disaster resilience building is limited. As such, the steps for tracking the popularity of sub-discussions over time are not applied in this study. Instead, the sub-discussions for four different periods (see Section 3.1 for details on time periods) and the content of the sub-discussion are compared. The comparison reveals the changes in the sub-discussions in different periods.

To understand the linkage among the extracted sub-discussions, the LLM-based summarization [8,22] is applied on the sub-discussions, and the linkage is visualized using the linkage network based on the shared content (i.e., social media posts shared between two different sub-discussions). The size of the nodes in the sub-discussion linkage network shows the popularity of the sub-discussion's topic (the topics are extracted using LLM-based summarization), and the link between nodes shows how much of the content (i.e., social media posts) is shared between two topics.

3. Public Narratives Around Morocco's Reconstruction and Resilience Building

3.1. Datasets

To understand the public narratives about Morocco's reconstruction plans and resilience building, this study is focused on two social media platforms. The first one is YouTube, as it includes the news narrative and people's comments on the news items, and can capture the interactions between the news outlets and public opinion. The second social media platform used in this study is X, as it usually reflects public opinions, as those personal opinions can be posted without commenting directly on news narratives. Table 1 shows the queries used to search for relevant posts on YouTube and X.

Table 1. The search queries used to extract relevant posts from YouTube and X.

Platform	Search Query	Translation
YouTube	(الخبراء نقاش الزلازل مقاومة آمنة منازل البناء سياسات الإعمار إعادة المغرب زلزال) OR (البناء بالطين في المغرب يثير الجدل بشأن إعادة الإعمار بعد الزلزال المدمر)	(Morocco earthquake: Reconstruction, building policies, safe earthquake-resistant homes, expert discussion) OR (Mud construction in Morocco sparks controversy over reconstruction after devastating earthquake)
X	(المغرب زلزال" OR "الحوز زلزال" OR #المغرب_زلزال" OR "طينية منازل") ("للزلازل المقاوم البناء معايير") ("الإعمار إعادة" OR "حديثة عمارة" OR "تقليدية عمارة") since:2023-09-10 until:2025-12-20 lang:ar	(Morocco Earthquake OR Al Hawz Earthquake OR #MoroccoEarthquake) (Mud Houses OR Traditional Architecture OR Modern Architecture OR Reconstruction) (Earthquake-Resistant Building Standards) since:2023-09-10 until:2025-12-20 lang:ar

In the YouTube search results, 150 top relevant results posted after 9 September with at least one comment and a publicly available transcript were examined (if the creator of the video has not opened public access to the video's transcript, the video was excluded to avoid potential ethical concerns). Out of these 150 results, 51 were discussing the reconstruction and recovery efforts (the 150 posts were examined manually to reduce the impact of promotion algorithms). The time limit was used to avoid including news items related to rescue efforts and to focus on recovery and reconstruction. The details of the 51 news items are given in Table A1. The transcripts of the videos are extracted manually (through YouTube public access), and the comments and replies are extracted using the public YouTube API. In total, 11,445 comments and replies are retrieved from YouTube.

The search queries are narrowed down to Arabic (although the search results included some non-Arabic posts). The French search queries were not included in the study, as it is not possible to distinguish between French-language posts from Morocco and European countries (most social media users do not share locations publicly). This could cause a more cultural oscillation in the data. Furthermore, the Amazigh-language search queries were not included in the study due to the lack of access to well-tested language models (i.e., for translation) trained on a large Amazigh-language dataset.

The X search query resulted in 290 posts (comments/replies are included and retweets are excluded) between 11 September 2023 and 9 December 2025. To track the public discourse over time, the posts are divided into four time periods. Table 2 shows the number of posts in these four time periods.

Table 2. Summary of X posts.

Time Period	Number of Posts	Total Number of Views	Total Number of Likes	Total Number of Reposts
P1: Before 2024-03-15	157	274,487	2963	424
P2: 2024-03-15–2024-09-14	34	44,712	245	30
P3: 2024-09-15–2025-03-14	44	51,006	1196	197
P4: After 2025-03-14	55	57,089	1062	153

As such, this study uses three sets of textual data to analyze the public discourse about Morocco's reconstruction and disaster resilience building. The three sets of textual data are the transcripts of YouTube news items, which display the news narratives; the comments on the news items, which reflect the public's opinion about the news narratives; and the relevant posts on X, which offer a broader perspective on the public discourse.

3.2. Public Narratives and Discourse About the Morocco Reconstruction and Resilience Building Plans

Following the PDA steps, the keywords are extracted from each of the three data sets. The Microsoft Azure text analysis service with specification provided in [24] is employed

to extract key phrases. Since some of the news items and comments were in different languages, all the texts are translated to English, and the English dialect is used in language models. The English language was chosen since the language models are trained on larger training data sets (due to data availability) and provide more robust results in general topics and uses [29–31]. Once the key phrases are extracted, the contextual network is built for each of the three data sets, and sub-discussions are extracted using the most frequent nodes. Table 3 shows the number of nodes (key phrases) and edges in each of the key-phrase networks.

Table 3. Number of nodes and edges in key-phrase networks.

Key-Phrase Network	Number of Nodes	Number of Edges
YouTube Transcript	3679	33,462
YouTube Comments	11,591	209,578
X Posts	1751	35,371

As shown in Table 3, the size of the three networks is huge, and clustering a large network can result in too many clusters [25]. In key-phrase networks, a large number of clusters will lead to a large number of sub-discussions (e.g., more than 100). When the number of sub-discussions is too large and the number of social media posts is not that big, a lot of sub-discussions will overlap and have similar content (as explained in Section 2, social media posts can be in more than one sub-discussion). To avoid large overlaps between sub-discussions, the most frequent edges are included in the cluster analysis of the key-phrase networks. However, excluding some of the edges from the cluster analysis might result in excluding some of the social media posts. The excluded social media posts will form an extra sub-discussion. The percentage of edges involved in the cluster analysis are selected to have the lowest number of clusters and highest percentage of included social media posts. In this study, the top 20% of frequent edges are used in X posts and the top 10% are used in each of the YouTube key-phrase network clustering. Figures 2–4 show the dendrograms for finding the sub-discussions in the three datasets. The horizontal axis in the dendrograms represents the frequent edges. As explained in Section 2, in the first step of the cluster analysis, each edge is considered one cluster. The height of the dendrogram shows the distance (i.e., inverse of the similarity) between clusters. The partition densities are calculated using Equation (2).
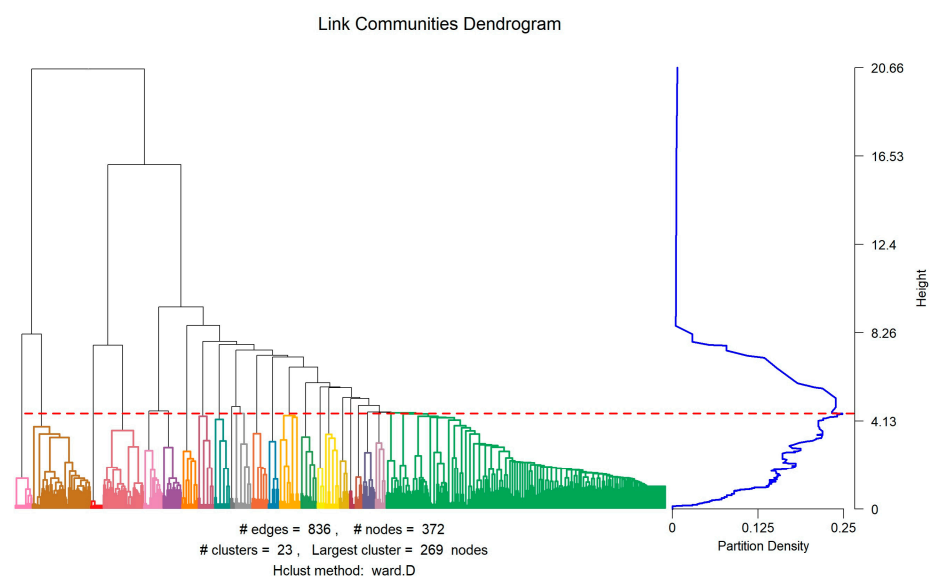

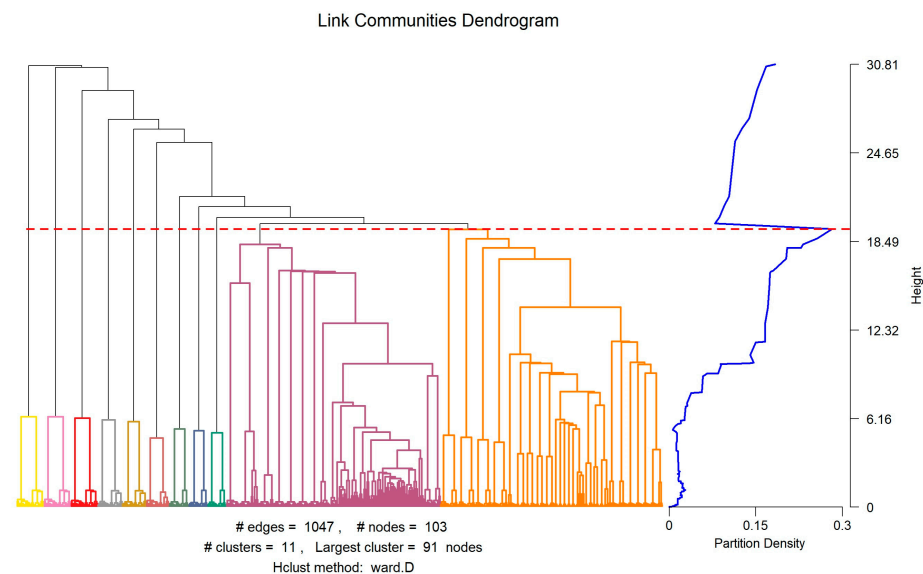**Figure 2.** Dendrogram for YouTube transcripts' key-phrase network.

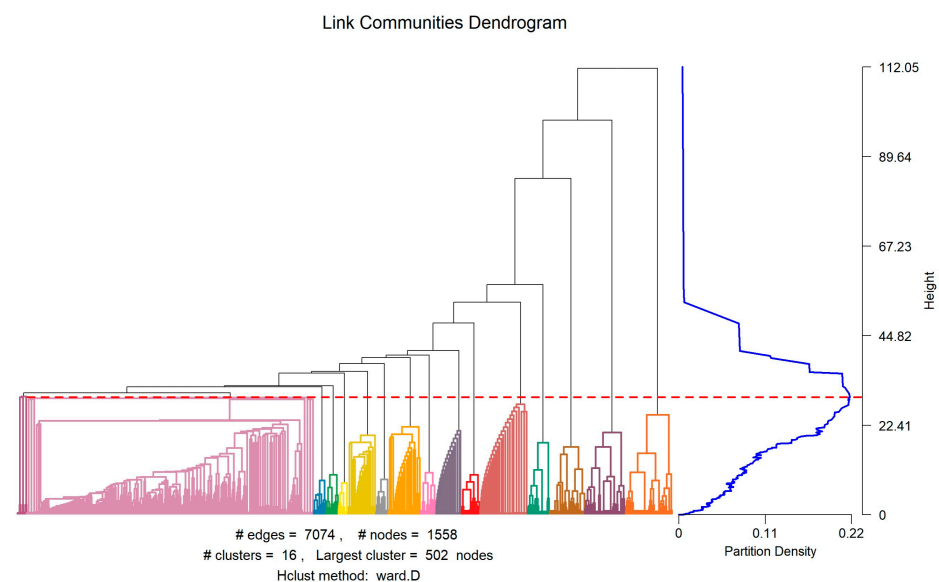**Figure 3.** Dendrogram for YouTube comments' key-phrase network.

Figure 4. Dendrogram for X posts' key-phrase network.

As can be seen in Figures 2–4 the optimal number of sub-discussions (communities) in YouTube transcripts is 24, in YouTube comments it is 12, and in X posts it is 16.

Using the PDA, the sub-discussions in news items' transcripts are extracted and summarized. As explained in Section 2, an LLM is used to summarize the sub-discussions and extract their topic. In this study the "gpt-3.5-turbo" engine is used for summarizing the sub-discussions and extracting their main topic. To account for the stochastic factor in the LLM results, the LLM-based summarization is repeated 10 times, and the results are integrated (the final summary is generated based on the 10 results). The integrated results are manually checked with the individual results from the 10 runs to ensure consistency.

3.3. Sub-Discussions in News Narratives

Table 4 shows the main topics of 24 sub-discussions extracted from YouTube transcripts. A summary of the sub-discussions is given in Appendix B.1.

Table 4. Main topic of the sub-discussions extracted from YouTube transcripts.

Community	Main Topic
C1	Morocco's earthquake, government rebuilding efforts, rescue operations, and the need for stronger construction standards
C2	Emergency camps and medical treatment for earthquake victims in Marrakech.
C3	Modern construction methods in Morocco using reinforced concrete and "Toubiya" stone
C4	Morocco's large-scale reconstruction plan and the challenges of post-earthquake recovery
C5	IMF loan to Morocco and discussions on debt relief, self-sufficiency, and disaster recovery
C6	G20 summit developments and transfer of presidency to Brazil
C7	G20 announcement on Ukraine and the call for adherence to international agreements
C8	Morocco's reconstruction challenges, including transport issues and lack of seismic building standards
C9	Unexpected earthquake in Al Hawz and geological explanations
C10	Responsible use of reconstruction funds and international solidarity in disaster relief
C11	Post-earthquake rebuilding, safe construction, and immediate shelter needs
C12	Causes of severe destruction from Morocco's major earthquake
C13	Earthquake as a catalyst for political awareness on housing and urban development
C14	Earthquake destruction, rescue operations, and impact on tourism
C15	Reconstruction challenges in earthquake-affected regions and long-term housing solutions
C16	The India–Middle East–Europe economic corridor announced by Saudi Arabia
C17	Morocco's reconstruction challenges after the Al Hawz earthquake
C18	Progress and remaining challenges in Morocco's post-earthquake housing reconstruction
C19	Debate over earthquake-resistant construction standards using mud and stone in Al Hawz
C20	Modern construction in Morocco using reinforced concrete and "Toubiya" stone
C21	Community–government cooperation in rebuilding and delivering aid to isolated villages
C22	Emergency shelters and medical treatment for earthquake victims in Marrakech
C23	Reconstruction of Moroccan villages and the need for earthquake-resistant building and international aid
C24	Post-earthquake rebuilding in Morocco using safe, mixed construction styles and coordinated aid

As shown in Table 4, the news outlets discussed the reconstruction and recovery from different perspectives. Sub-discussions 4, 8, 15, 17, and 18 reflect the challenges in reconstruction; sub-discussions 1, 3, 8, 11, 13, 19, 20, 23, and 24 reflect the efficiency of reconstruction and reducing future disaster risks. Fund management and communities' collaboration are discussed in sub-discussions 5, 10, 21, and 23, while sub-discussions 1, 4, 5, and 10 are discussing the plans for recovery. The discussion about the causes of severe destruction in the Morocco earthquake is reflected in sub-discussions 9 and 12. Table 4 also shows that some aspects of the news narratives were not directly related to the reconstruction (C2, C14, C22, and part of C1 are discussing emergency response efforts, and C6, C7, and C16 are discussing international events). These sub-discussions show the presence of noise (unrelated content) in the news narrative. The presence of such noise is not extraordinary, as some news videos cover a broad range of events. Furthermore, the noise is separated from the reconstruction and resilience narrative in the results of PDA. Additionally, the 24 extracted sub-discussions show an overlap among some sub-discussions. In other words, the extracted sub-discussions have fine-grained resolution, and some of them can form more general narratives. The links between sub-discussions are given in Figure 5.

Figure 5 shows the links between sub-discussions, based on their shared content (shared key phrases). The size of the nodes shows how one sub-discussion gained more attention in the news narrative relative to other sub-discussions (i.e., how much its key phrases are used in the news). The size of the edges indicates the extent to which two sub-discussions share content compared to other shared content. According to Figure 5, the highest frequency of content (i.e., sentences containing the sub-discussion key phrases) belongs to C23, C17, C18, and C24. It shows that the most attention in this data is given to reconstruction efficiency, challenges, and funding. Additionally, there is a strong connection (shown as a thick edge) between C18 (progress and remaining challenges) and C19 (debate over earthquake-resistant construction). The lack of the presence of other aspects (e.g., the construction and recovery speed, transparency measurement, and fund allocation priorities) shows that those aspects had a relatively lower presence frequency and were not detected as a sub-discussion in PDA.
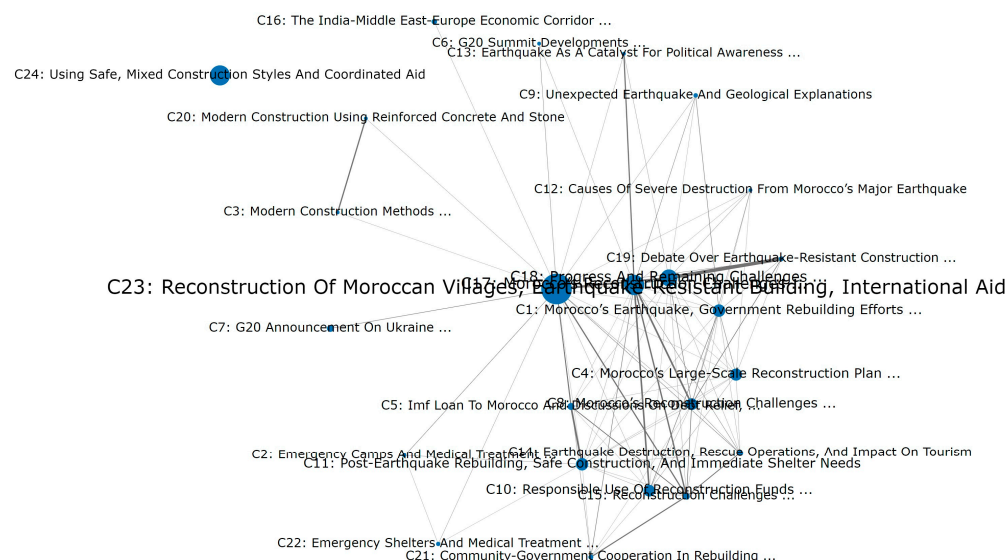
Figure 5. Linkage network among the sub-discussions of news narratives based on their shared content.

3.4. Public Opinion About the News Narrative

To understand how much the sub-discussions in the news narratives are directly reflected in public opinion, the PDA is applied to comments on the news items on YouTube. The results of PDA show 12 sub-discussions are extracted from YouTube comments. Table 5 provides the main topics of these 12 sub-discussions. A summary of the sub-discussions is given in Appendix B.2.

Table 5. Summary of the sub-discussions extracted from YouTube comments.

Community	Main Topic
C1	Religious teachings on worship, morality, and unity
C2	Religious guidance with social and ethical warnings
C3	Religious guidance on governance, justice, and accountability
C4	Religious moral teachings and warnings against corruption
C5	Religious principles of righteous conduct and social justice
C6	Earthquake aftermath, accountability, and religious reflection
C7	Condolences, prayers, and religious unity
C8	Prayers, anti-corruption calls, and warnings against injustice
C9	Solidarity with Algerian disaster victims and calls for justice
C10	Corruption and government neglect in disaster response
C11	Criticism of government corruption and mismanagement
C12	Political and social criticism in Algeria and Morocco

As shown in Table 5, most of the comments revolve around religious teaching (C1, C2, C3, C4, C5, C7 and C8) and concerns about resource management and fund allocations (C10, C11, and C12) as well as the call for accountability (C6, C8, and C9). The presence of religious teaching and guidance shows the cultural aspect of society's response to disasters [32]. Furthermore, sub-discussion 9 (solidarity with Algerian disaster victims) shows the presence of noise (the comments related to flash flooding in Algeria in September 2023) in this data.

As can be seen, the narratives from YouTube comments are mostly focused on religious prayers and concerns about resource management. In other words, most of the news narratives about future plans, disaster resilience, and reconstruction efforts have not been reflected in the comments. The high level of concern about allegations in recovery fund management can be rooted in the unofficial news and allegations spread in society (either through other social media platforms or through offline social interactions) or due to frustrations caused by slow recovery. However, the driving factors that fuel these discussions are not observable in this data. The YouTube comments show that the main dis-

cussion is about these issues, but they do not prove their origins. It should be noted that the root of these concerns might have been shaped in other social media platforms or even by real-world social interactions. Figure 6 shows the content-based connections among these 12 sub-discussions. As can be seen in Figure 6, while part of the discussions are focused on the management of funds, a relatively smaller part of the comments discusses justice and accountability measures (C6, C8, and C9). Furthermore, the strongest connection among sub-discussions is between C10 (corruption and government neglect in disaster response) and C6 (earthquake aftermath, accountability, and religious reflection).
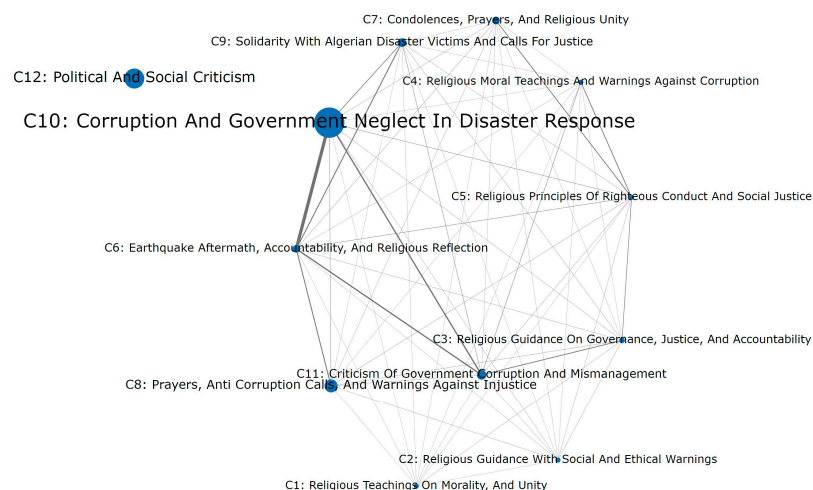

Figure 6. Linkage network among the sub-discussions of YouTube comments based on their shared content.

3.5. Sub-Discussions in Public Discourse on X

To get a more detailed image of public discourse around the Morocco earthquake reconstruction and resilience building, the PDA is applied on the posts extracted from X with the query shown in Table 1. The PDA extracted 16 sub-discussions from X posts. To track the changes in discussions over time, the summary of sub-discussions is extracted separately in four time periods (see Table 3 for time periods). The topics of the sub-discussions are given in Table 6. Summaries of the sub-discussions in the four time periods are given in Appendix B.3.

Table 6. Summary of the sub-discussions extracted from X posts.

Community	Main Topic
C1	Differences in reconstruction funding
C2	Concerns about the delays and transparency in fund management
C3	Rehousing residents, rebuilding homes, and rehabilitating infrastructure
C4	Reconstruction support and materials
C5	Aftermath of the devastating earthquake and call for urgent assistance
C6	Reconstruction efforts
C7	Challenges in reconstruction, and international support
C8	Establishment of regional emergency reserves, and the challenges faced in rebuilding
C9	Infrastructure fragility and the reconstruction program
C10	Efforts and challenges to overseeing transparency in the reconstruction process and ensuring efficiency
C11	Classifying and qualifying construction sector
C12	Responsible reconstruction, recovery, and crisis management and temporary solutions
C13	Reconstruction challenges, aids and building materials
C14	Reconstruction program
C15	Reconstruction efforts
C16	Opportunity reconstruction presents for training unemployed youth in construction

The summary of the sub-discussions over the four periods of time (Appendix B.3) shows most of the public discourse in the earlier periods is focused on the reconstruction

plans and resilience building. However, in the later periods, the sub-discussions are divided into different groups. Some are focused on concerns about the reconstruction speed and efficiency, and transparency becomes frequent. Another group is formed, primarily focusing on the accomplishments of the reconstruction efforts. Furthermore, some of the sub-discussions are only popular in the earlier periods (e.g., the discussion about the opportunities created by reconstruction efforts and the classification of the construction quality), while some others are discussed in the beginning and the later periods (e.g., responsible recovery plans, reconstruction challenges, and infrastructure fragility). Figures 7–10 show the links among the 16 sub-discussions in the four time periods.
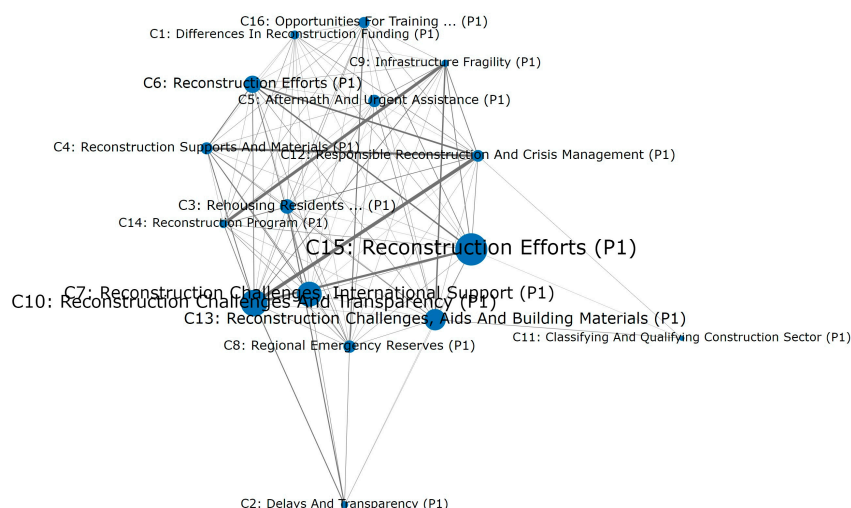

Figure 7. Linkage network among the sub-discussions of X posts before 2024-03-15 based on their shared content.
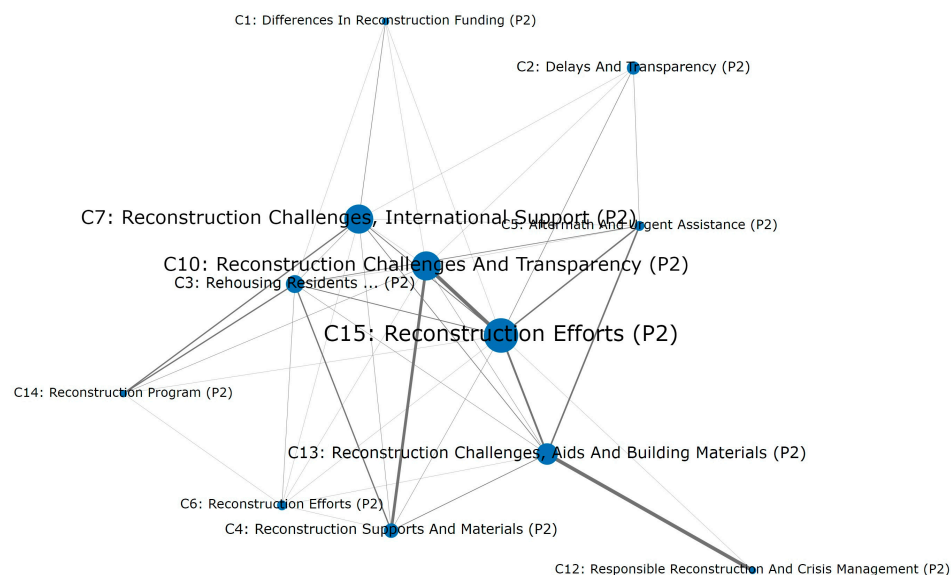

Figure 8. Linkage network among the sub-discussions of X posts between 2024-03-15 and 2024-09-14 based on their shared content.

As can be seen in Figure 7, the most popular aspects of the public discourse before 2024-03-15 are sub-discussions 15, 10, 7, and 13 (i.e., reconstruction efforts, challenges, international support, transparency, and aids and building materials). There is a strong connection evident between sub-discussions 12 and 10 (responsible reconstruction, crisis management, and transparency). This indicates that the discussions on responsible reconstruction and crisis management share content with those on transparency. In other words, these two topics have been discussed close to each other. However, the focus was more on

transparency. Another strong connection is between sub-discussions 9 and 14 (i.e., infrastructure fragility and the reconstruction program). However, the size of their node shows that neither of them attracted much attention.
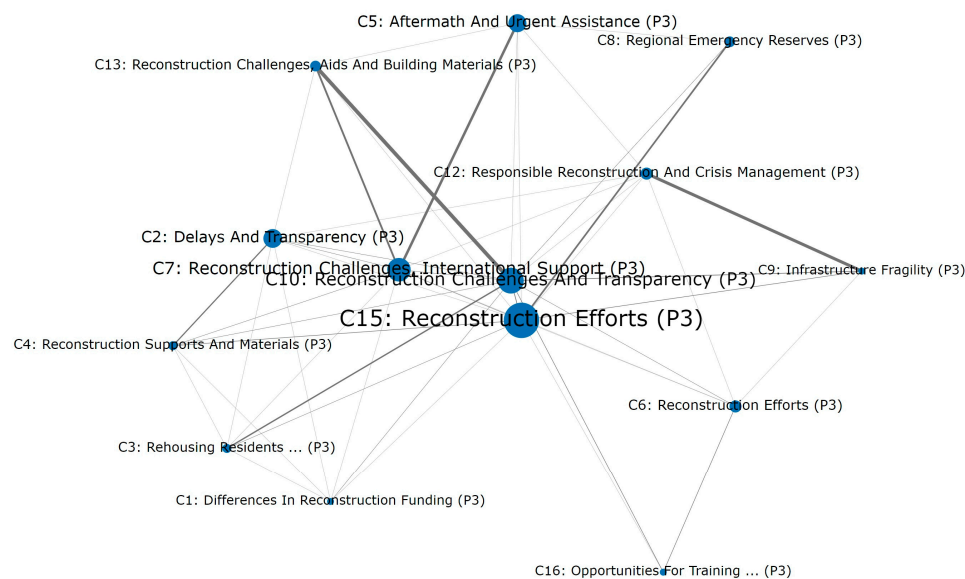

Figure 9. Linkage network among the sub-discussions of X post between 2024-09-14 and 2025-03-14 based on their shared content.
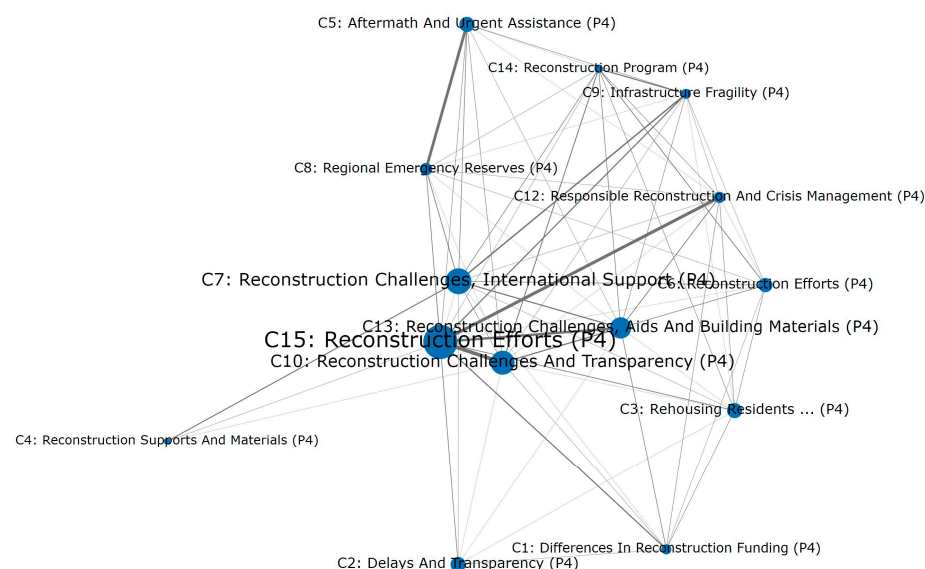

Figure 10. Linkage network among the sub-discussions of X posts after 2025-03-14 based on their shared content.

According to Figure 8, the most engaged sub-discussions between 2024-03-15 and 2024-09-14 are sub-discussions 15, 10, and 7 (i.e., reconstruction efforts, challenges, international support, and transparency). The strangest connections among the sub-discussions in this period are formed between reconstruction efforts, and challenges in transparency (sub-discussions 15 and 10), as well as responsible reconstruction and crisis management, and the reconstruction challenges and building materials (sub-discussions 13 and 12), and the reconstruction support and transparency (sub-discussions 10 and 4). In other words, the discussion about the reconstruction efforts has shared a large amount of content with the transparency discussion. Furthermore, the discussion about the reconstruction challenges and building materials was closely connected to responsible reconstruction and crisis man-

agement. Similarly, the discussion about the reconstruction challenges and transparency also shared the content with the discussion about reconstruction support. It shows that the challenges in reconstruction have been discussed from different points of view, including transparency, support for building materials, and responsible reconstruction.

As shown in Figure 9, the most engaged topics in X posts between 2024-09-14 and 2025-03-14 are again reconstruction efforts, challenges, international support, and transparency (i.e., sub-discussions 15, 10, and 7). However, the shared content between sub-discussions is changed in comparison to the previous period. Some of the most shared content is about reconstruction challenges, aids and building materials, and discussions about transparency. In other words, the discussion around reconstruction challenges in this period was more focused on transparency, aid, and building materials. The other frequent shared content was between urgent assistance and international support (i.e., sub-discussions 5 and 7) as well as responsible reconstruction and crisis management, and infrastructure fragility (i.e., sub-discussions 12 and 9).

After 2025-03-14, as shown in Figure 10, the most frequent sub-discussion was about reconstruction efforts (i.e., sub-discussion 15). The discussions about reconstruction challenges, transparency, international support, responsible reconstruction, and building materials were also frequent (i.e., sub-discussions 7, 10, and 13). The most shared content included discussions on reconstruction efforts, responsible reconstruction, and crisis management (sub-discussions 12 and 15), as well as topics related to the disaster aftermath, urgent support, regional emergency reserves, and the challenges faced in rebuilding (sub-discussions 5 and 8).

4. Discussion

The three narratives extracted in the previous section show the gaps and the connections among the narratives from three sources. The news narrative for YouTube shows that the reconstruction plans and resilience building have been discussed from different perspectives, including the building standards for increasing disaster resilience, the economic recovery plans, and the challenges in reconstruction. Furthermore, it includes the discussions about the delayed reconstruction plans, though it does not include the discussion or investigation on management issues as possible roots for reconstruction delays. The discussion in the YouTube comments, however, shows a large contextual gap between the public narrative about the reconstruction and resilience-building plans and the news narrative. While the news narrative discusses different aspects of disaster resilience building, the public narrative is focused on the delays to reconstruction and its possible driving factors.

This indicates that public discourse typically prioritizes immediate needs, such as the reconstruction of destroyed residential buildings and infrastructure in areas affected by earthquakes. The discussion about the quality of the constructions comes later, when the first eminent need is addressed. Although most of the content in public discourse from YouTube comments shows the frustration caused by slow reconstruction progress, some of it discusses transparency measures as a solution. This shows that the transparency strategies adopted in the planning of reconstruction and the disaster resilience-building process were either not effective enough to ensure transparency over time, or they were not implemented effectively. Furthermore, it shows the importance of including transparency measures in implementing reconstruction and disaster resilience-building strategies for more efficient project management and for tracking progress.

The public narratives from X posts show that, on the X platform, the gap between news narratives and the public narrative is closed, as it includes the content created by official organizations, the news outlets, and people in society. This narrative shows that the frustration

about the slow progress in reconstruction formed over time and did not exist in the beginning. Furthermore, the discussion about transparency is evident here as well, with more details, including responsible reconstruction and the addressing of infrastructure fragility.

The public discourse shows concerns about the management of funds and reconstruction processes. These concerns are partly triggered by slow reconstruction progress, as is reflected in the news narrative as well. However, the other roots that trigger these discussions and allegations are not evident in these narratives. To better understand the roots and drivers of these discussions, more data should be analyzed (e.g., official news outlets, local blogs, fact-checking resources, and social surveys and interviews).

The concerns and allegations in the public narratives need to be fact-checked and verified. While some public concerns can be legitimate, some other concerns are triggered by misinformation and accusations. However, it remains necessary to adopt and implement transparency policies. If the concerns are legitimate, transparency policies can help rebuild public trust. In the case that the concerns are triggered by misinformation, transparency policies can combat the dissemination of misinformation. The necessity of adopting transparency is well documented and discussed. However, in practice, the implementation of such policies might be considered secondary to the rapid implementation of other policies. These results show the downside of such a trade-off.

In theory there are different possible roots that can create the gap between the news narrative and the public narrative. One possible factor is the frustration and emotional reactions after disasters, and hardship in temporary settlements. In these situations, the community is more concerned with pressing issues [33–35]. Furthermore, in emotional situations, allegations (regardless of being true or not), misinformation, and conspiracy narratives disseminate faster and gain more publicity [36–38]. This hypothesis can be tested by running surveys and interviews to collect more data about the emotional status of the community as well as public trust in authorities and the media. Past experiences and historical events can be another factor that creates the gap between news narratives and the public narrative [39]. Another factor creating the narrative gap can be the limited functionality of the media. The media usually do not cover disaster recovery in the long term [40]. To test this hypothesis, it is necessary to investigate the local news outlets (i.e., newspapers, news networks, podcasts, etc.) to find which of these media are filling this gap. As shown in this study, the social media posts from the X platform do not show the gap between narratives.

As mentioned before, insights from the public narrative can contribute to policy-making in different capacities. During the early stages of designing policy, insights from social narratives can help to include public concerns and priorities in the adopted policy. In this case, the policy is being presented and discussed publicly. Public perception about the policy and related concerns will help policy-makers to update the policy before implementation [41,42]. For instance, the early signs of public narratives around accusations of corruption highlight the risk of the dissemination of misinformation, and policy-makers can include informativeness and transparency measures based on public concerns. In the same manner, monitoring the public narrative after the adoption of the policy helps policy-makers to update the implementation strategies to increase efficiency [8,22]. Furthermore, the analysis of public narratives in past events provides insights for designing more effective policies in the future. For instance, as shown in this study, neglecting transparency and informative measures in the policy can cause frustration and criticism in society and affect communities' cooperation in implementing the policy. Furthermore, it shows the high importance of fast reconstruction in decision-making. Using this insight, the policy-maker can hypothesize the importance of these criteria in decision-making and test for them in the early stages [8,22] (see [41–43] on more details on the interconnection between the public narrative and policy).

5. Conclusions

After a disaster occurs, the reconstruction efforts are usually paired with resilience-building strategies. The efficient implementation of reconstruction plans alongside disaster resilience building relies on considering the dynamic changes in socioeconomic variables. These changes are partially reflected in public discourse. The content and structure of public discourse reveal priorities in society and potential challenges in implementing the adopted policies and strategies. This study analyzed the public discourse about the reconstruction and disaster resilience-building strategies after Morocco's 2023 earthquake. The public discourse and news narratives are extracted from YouTube and X platforms.

The result of public discourse analysis reveals that the Moroccan authorities adopted reconstruction strategies and disaster resilience-building policies shortly after the disaster. The reconstruction plans, along with the building standards and earthquake-resistant construction, were discussed from different perspectives in news narratives. This included discussions about financial support, economic recovery and the classification of the construction quality, as well as the reconstruction plans. However, not all of the aspects discussed in news narratives were reflected in public discourse. Most of the public discourse was focused on concerns about fund management and recovery speed. Part of the public discourse on YouTube and X shows these concerns; however, not all of the drivers of these concerns are discussed on these platforms. Furthermore, the public discourse discusses the necessity of responsible reconstruction and transparency as possible solutions to address these concerns.

These results show the importance of adopting and implementing effective transparency-building policies alongside reconstruction and disaster resilience-building strategies. These policies can improve the efficiency of project management and the allocation of resources. Furthermore, the result of public discourse analysis indicates that people's priorities lie in reconstruction before resilience building. As shown in the results, the news narrative discusses different aspects of disaster resilience and reconstruction efforts. However, the only part that finds its way into public discourse is the concern about the reconstruction speed, rather than the building standards in the reconstruction plans. As such, the trade-off between the reconstruction speed and the disaster resilience-building strategies is important in crafting efficient policies.

The result of this study reveals the insights from public discourse learned from reconstruction and disaster resilience building after Morocco's 2023 earthquake. However, it also reveals the need to use different data sources to gain a better understanding of the effectiveness of the adopted policies. As the results show, social media platforms can reflect public concerns; however, they do not give all the details about the drivers of those concerns. For instance, the concerns about fund management have been evident in the public discourse in this study, and the news narratives show that part of the concerns were triggered by delays to reconstruction projects. The news narrative also discusses the physical and economic challenges in the reconstruction. However, how the allegations of corruption were sparked in the public discourse remains unclear. To have a better understanding, the public discourse analysis from social media has to be coupled with insights from fact-checking sources, interviews with people in society, and social surveys. These integrated insights will help policy-makers to determine the roots of the concerns and address them in the earlier stages.

Another issue in the results from public discourse on social media is that part of society is not actively engaged in the public discourse on social media platforms. As such, the results from social media can be biased and need to be adjusted based on surveys. In other words, the results do not support a broad conclusion and only show narratives from the investigated social media. On the other hand, social surveys without the use of social media

data cannot show the complete image of public discourse either. The surveys and questionnaires are designed based on existing hypotheses (e.g., the hypothesis about the possible concerns or issues), and the public discourse analysis on social media data is exploratory and can detect the concerns without the prior hypothesis. As such, it is important to use both methods simultaneously to have more detailed insights. Furthermore, the findings of this study rely on the socioeconomic and cultural aspects of the Morocco earthquake. As such, these results can be used as preliminary guides for other cases. However, policy-making for each country and region should take into account the specific characteristics of the given country or region.

Author Contributions: Conceptualization, M.R.Y. and N.K.; methodology, M.R.Y.; software, M.R.Y.; vali-dation, M.R.Y. and N.K.; formal analysis, M.R.Y.; investigation, M.R.Y.; resources, M.R.Y. and N.K.; data curation, M.R.Y.; writing—original draft preparation, M.R.Y.; writing—review and editing, M.R.Y. and N.K.; visualization, M.R.Y.; supervision, M.R.Y. and N.K.; project administration, N.K.; funding acquisition, N.K. All authors have read and agreed to the published version of the manuscript.

Data Availability Statement: No new data were created or analyzed in this study.

Conflicts of Interest: The authors declare no conflicts of interest.

Abbreviations

The following abbreviations are used in this manuscript:

PDA	Public Discourse (Discussion) Analysis
LLM	Large Language Model

Appendix A. Summary of Retrieved YouTube Videos

Table A1. Summary of YouTube videos.

ID	Date	Number of Views	# Comments	URL	ID	Date	Number of Views	Number of Comments & Replies	URL
1	2024-09-08	29,795	291	https://www.youtube.com/watch?v=vdNwAiZtFzQ (accessed on 27 January 2026)	27	2023-09-10	1150	3	https://www.youtube.com/watch?v=DEvHyZJOUrI (accessed on 27 January 2026)
2	2024-09-07	32,096	469	https://www.youtube.com/watch?v=I1HXc7gxkTk (accessed on 27 January 2026)	28	2023-09-18	29,453	65	https://www.youtube.com/watch?v=rO0xa7uMOPE (accessed on 27 January 2026)
3	2023-09-20	127,134	439	https://www.youtube.com/watch?v=oFODN8bcOCE (accessed on 27 January 2026)	29	2025-03-20	667	2	https://www.youtube.com/watch?v=EZzvBsNRSTE (accessed on 27 January 2026)
4	2023-09-23	1719	30	https://www.youtube.com/watch?v=vjpmmkzaDZE (accessed on 27 January 2026)	30	2023-10-13	981	5	https://www.youtube.com/watch?v=aMIfLoCNZ4Q (accessed on 27 January 2026)
5	2023-09-26	16,126	24	https://www.youtube.com/watch?v=t73qfddPzPU (accessed on 27 January 2026)	31	2023-09-12	7780	5	https://www.youtube.com/watch?v=oj62sfK7AGQ (accessed on 27 January 2026)
6	2023-09-11	8750	70	https://www.youtube.com/watch?v=-wQZ-ktDa1A (accessed on 27 January 2026)	32	2023-09-24	1669	3	https://www.youtube.com/watch?v=CDFeGFzH5yQ (accessed on 27 January 2026)
7	2023-09-21	1720	18	https://www.youtube.com/watch?v=TTdX0jnOj8A (accessed on 27 January 2026)	33	2023-09-11	8336	10	https://www.youtube.com/watch?v=SWaTH8822CM (accessed on 27 January 2026)

Table A1. *Cont.*

ID	Date	Number of Views	# Comments	URL	ID	Date	Number of Views	Number of Comments & Replies	URL
8	2023-09-15	4299	10	https://www.youtube.com/watch?v=GvGpzebgdCw (accessed on 27 January 2026)	34	2023-09-23	4935	11	https://www.youtube.com/watch?v=2xZeQD3IzRU (accessed on 27 January 2026)
9	2023-09-10	18,308	18	https://www.youtube.com/watch?v=-ZhVtGRvKlM (accessed on 27 January 2026)	35	2025-01-06	2031	27	https://www.youtube.com/watch?v=_8Qwi_IseYw (accessed on 27 January 2026)
10	2023-09-16	552	7	https://www.youtube.com/watch?v=SngSz3nPCjY (accessed on 27 January 2026)	36	2023-09-21	2165	16	https://www.youtube.com/watch?v=crNlyap8mXU (accessed on 27 January 2026)
11	2023-09-25	3658	6	https://www.youtube.com/watch?v=cCqWsbWmuRU (accessed on 27 January 2026)	37	2026-01-26	47,740	12	https://www.youtube.com/watch?v=xpQxS42AQQg (accessed on 27 January 2026)
12	2025-01-28	77,742	423	https://www.youtube.com/watch?v=YhI9u0n61DE (accessed on 27 January 2026)	38	2023-09-20	39,664	129	https://www.youtube.com/watch?v=beh1scsJzbw (accessed on 27 January 2026)
13	2023-09-14	4119	19	https://www.youtube.com/watch?v=V86lJwY2bdU (accessed on 27 January 2026)	39	2023-09-12	11,030	10	https://www.youtube.com/watch?v=HD45dPH7aC4 (accessed on 27 January 2026)
14	2023-09-11	823	3	https://www.youtube.com/watch?v=gF1WvX4Oc-s (accessed on 27 January 2026)	40	2023-09-12	1393	16	https://www.youtube.com/watch?v=_KN8tDF5yHA (accessed on 27 January 2026)
15	2023-10-13	1819	6	https://www.youtube.com/watch?v=YrR-Qudn8ek (accessed on 27 January 2026)	41	2023-09-11	4825	40	https://www.youtube.com/watch?v=4AHrM0NhlYc (accessed on 27 January 2026)
16	2025-07-11	2445	6	https://www.youtube.com/watch?v=3lmqOul6KQ8 (accessed on 27 January 2026)	42	2025-03-17	28,799	180	https://www.youtube.com/watch?v=1RuCFq-ij6Ez (accessed on 27 January 2026)
17	2023-12-20	7404	7	https://www.youtube.com/watch?v=3DZcMq8wC-U (accessed on 27 January 2026)	43	2023-09-18	2424	10	https://www.youtube.com/watch?v=59fLwr-JMKw (accessed on 27 January 2026)
18	2023-09-12	2071	3	https://www.youtube.com/watch?v=RfP-Puk4Sac (accessed on 27 January 2026)	44	2023-09-10	1,594,648	3753	https://www.youtube.com/watch?v=ekeQ_W5O5ao (accessed on 27 January 2026)
19	2025-10-09	22,040	381	https://www.youtube.com/watch?v=SXMgC8Gc4C0 (accessed on 27 January 2026)	45	2024-11-01	3995	5	https://www.youtube.com/watch?v=6VDk4ILXjYA (accessed on 27 January 2026)
20	2023-09-10	1993	11	https://www.youtube.com/watch?v=QyzVdOzdZ3g (accessed on 27 January 2026)	46	2023-09-17	1680	2	https://www.youtube.com/watch?v=XVHEYU59IPA (accessed on 27 January 2026)
21	2023-09-16	1613	5	https://www.youtube.com/watch?v=qRKW75pgw_I (accessed on 27 January 2026)	47	2025-03-13	1336	7	https://www.youtube.com/watch?v=nmQGH1_xBT0 (accessed on 27 January 2026)
22	2025-09-14	26,030	156	https://www.youtube.com/watch?v=RFMd_iDvOtA (accessed on 27 January 2026)	48	2023-09-22	10,512	9	https://www.youtube.com/watch?v=S8FXP2iVHXI (accessed on 27 January 2026)
23	2025-03-13	12,467	161	https://www.youtube.com/watch?v=8ZqU_-zKfx0 (accessed on 27 January 2026)	49	2024-09-11	2783	28	https://www.youtube.com/watch?v=WIOkQI3dy2g (accessed on 27 January 2026)
24	2023-09-10	8737	16	https://www.youtube.com/watch?v=yJwIbv_UGdw (accessed on 27 January 2026)	50	2025-03-11	249,841	4402	https://www.youtube.com/watch?v=0pU4ppAixgE (accessed on 27 January 2026)
25	2023-09-21	10,392	43	https://www.youtube.com/watch?v=AQHOaXKNRs0 (accessed on 27 January 2026)	51	2023-09-11	16,005	11	https://www.youtube.com/watch?v=BR1tVmtrQlw (accessed on 27 January 2026)

Table A1. *Cont.*

ID	Date	Number of Views	# Comments	URL	ID	Date	Number of Views	Number of Comments & Replies	URL
26	2023-09-11	14,725	62	https://www.youtube.com/watch?v=vlkeSBUTGD8 (accessed on 27 January 2026)					

Appendix B. Sub-Discussion Summaries

Appendix B.1. Summary of YouTube Transcript Sub-Discussions

C1. Morocco's earthquake, government rebuilding efforts, rescue operations, and the need for stronger construction standards:

A devastating earthquake in Morocco led to government support for rebuilding homes, with ongoing rescue and relief efforts. Despite the disaster, the international community plans to continue annual meetings in Morocco. The need for better construction standards to prevent future tragedies has been emphasized, with social media showing sympathy for the victims.

C2. Emergency camps and medical treatment for earthquake victims in Marrakech:

Multiple camps have been set up to shelter victims and missing persons, providing treatments in field hospitals or sending urgent cases to university or military hospitals. The wounded are receiving treatments in hospitals in Marrakech, awaiting medical teams to help them return to normal life.

C3. Modern construction methods in Morocco using reinforced concrete and "Toubiya" stone:

The conversation discussed the construction of a building using reinforced concrete at the bottom and "Toubiya," a modern stone used in factories in Morocco. The building was described as being built in a modern way, incorporating these materials for construction.

C4. Morocco's large-scale reconstruction plan and the challenges of post-earthquake recovery:

Morocco faces challenges in rebuilding after an earthquake, with plans to allocate $12 billion over five years. The country has completed the initial phase of its response plan and established a fund for reconstruction. International support is needed, and social media has shown a strong response to the disaster. Ongoing search and rescue operations are in progress for the 4.2 million affected people.

C5. IMF loan to Morocco and discussions on debt relief, self-sufficiency, and disaster recovery:

The International Monetary Fund has agreed to provide Morocco with a $1.3 billion loan to address climate change. There are discussions about freezing Morocco's debts during this difficult time. The focus is on self-sufficiency and urban development. Foreign aid is being considered, but the priority is on providing shelter and support to those affected by recent disasters.

C6. G20 summit developments and transfer of presidency to Brazil:

Today at the G20 summit in India, the presidency for the next summit was handed over to Brazil. The G20 group adopted a consensus statement officially welcoming the strength of five or more. Ghassan Sweidan from the Jordanian Earthquake Monitoring Center in Amman sent his regards and prayed for the safety of those in standing buildings.

C7. G20 announcement on Ukraine and the call for adherence to international agreements:

The recent announcement from New Delhi did not explicitly address the military operation in Ukraine, but emphasized the importance of countries adhering to international agreements. Some expected a clear extension of the war in Ukraine by Russia. The G20 summit focused on economic and political aspects, with demands for countries to commit

to international conventions. Russia had warned of disrupting the announcement if an explicit extension of the military operation in Ukraine was included. Observers noted that the announcement only called for adherence to international agreements, not an extension of the conflict.

C8. Morocco's reconstruction challenges, including transport issues and lack of seismic building standards:

Morocco faces challenges in rebuilding earthquake-affected areas due to transportation issues and a lack of seismic construction standards. The government is prioritizing reconstruction efforts, including implementing laws for earthquake-resistant construction and finding financing. The Prime Minister offers condolences, the King allocates funds, and social media shows sympathy for those affected.

C9. Unexpected earthquake in Al Hawz and geological explanations:

Geologists were surprised by the recent earthquake in Al Hawz, as it occurred in an area not typically associated with seismic activity near fault lines or plate boundaries. The epicenter was in the village of Aigle, caused by the collision of the African and Eurasian plates, resulting in a rescue operation for survivors.

C10. Responsible use of reconstruction funds and international solidarity in disaster relief:

The conversation highlighted the importance of using funds wisely to rebuild homes lost in disasters and provide shelter for those in need. International support and solidarity were emphasized, along with efforts to improve rescue operations. Relief organizations are sending aid to Morocco, Saudi Arabia allocated funds for the global economy, and efforts are ongoing to provide aid to earthquake victims. Authorities in Morocco are expected to provide housing and support for those affected, while a ministerial committee works on reconstruction efforts. People are in need of assistance, with some focused on rebuilding and others on political outcomes.

C11. Post-earthquake rebuilding, safe construction, and immediate shelter needs:

The conversation discussed the importance of using funds wisely to rebuild homes lost in the earthquake, ensuring safety in construction, providing immediate shelter, and considering alternative living areas. The government, international aid, and local organizations are working together to rescue survivors and provide essential aid to affected communities. Despite aid efforts, some individuals still lack basic necessities like shelter, and Morocco plans to rebuild with a $12 billion budget over five years.

C12. Causes of severe destruction from Morocco's major earthquake:

The conversation discusses a significant earthquake, with varying reports on its depth from Moroccan and American observatories. Factors such as the geological nature of the region, construction quality, and proximity to earthquake-prone areas are cited as reasons for the extensive destruction caused by the earthquake in Morocco.

C13. Earthquake as a catalyst for political awareness on housing and urban development:

The conversation discusses the potential impact of an earthquake disaster in Morocco on raising awareness among politicians and officials about prioritizing housing and urban development. It is believed that experiences from past earthquakes in Al Hawz could lead to positive changes in Morocco's approach to disaster preparedness and response.

C14. Earthquake destruction, rescue operations, and impact on tourism:

A group recorded a building collapse in front of a residential building with signs of destruction. The earthquake epicenters behind the mountains caused widespread destruction in mountainous areas. Rescue services reached affected areas quickly. The earthquake's impact included damaged buildings and the loss of lives, affecting the tourism sector in the region.

C15. Reconstruction challenges in earthquake-affected regions and long-term housing solutions:

The conversation revolves around the reconstruction efforts in a region affected by earthquakes, considering the area's historical significance and difficult terrain. The focus is on involving technicians and engineers, learning from international experiences, and providing assistance to affected communities. The discussion also touches on the challenges faced by volunteers in delivering aid due to road closures and rugged conditions. The conversation highlights the need for long-term solutions to provide housing and support for displaced populations.

C16. The India–Middle East–Europe economic corridor announced by Saudi Arabia:

The Saudi Crown Prince announced the signing of a memorandum of understanding for the economic corridor project between India, the Middle East, and Europe. The project aims to enhance economic ties and achieve common interests. Discussions took place during a summit with Arab colleagues closely monitoring. The project includes railway connections and connecting seaports.

C17. Morocco's reconstruction challenges after the Al Hawz earthquake:

Morocco is facing challenges in rebuilding after a devastating earthquake in the Al Hawz region, with estimated losses of $11 billion. The government is prioritizing safety in construction and preserving historical architecture while meeting earthquake-resistant standards. Efforts are being made to support those affected by the tragedy, with ongoing reconstruction plans and aid allocation. Social media users are calling for better disaster response planning.

C18. Progress and remaining challenges in Morocco's post-earthquake housing reconstruction:

Morocco has made progress in rebuilding homes post-earthquake, with international support and financial aid. Challenges remain in providing shelter, economic recovery, and environmentally friendly construction. Discussions on financing and prioritizing reconstruction efforts are ongoing. The country aims to prioritize residents' preferences and expert opinions in the rebuilding process.

C19. Debate over earthquake-resistant construction standards using mud and stone in Al Hawz:

Discussion revolves around implementing a law in Al Hawz, Morocco, to define standards for earthquake-resistant construction using mud and stones. Concerns were raised about the lack of adherence to standards in villages, especially among low-income farmers. There was debate over whether traditional mud-and-stone construction is as safe as modern methods. The vulnerability of natural-material houses to earthquakes was highlighted.

C20. Modern construction in Morocco using reinforced concrete and "Toubiya" stone:

The conversation discussed the construction of a building using modern materials like reinforced concrete and "Toubiya," a type of stone assembled in factories. The building is described as being built in a modern way, incorporating these materials commonly used in Moroccan construction.

C21. Community–government cooperation in rebuilding and delivering aid to isolated villages:

Residents in a neighborhood are working together with Moroccan authorities to rebuild houses damaged by an earthquake. The Royal Armed Forces are delivering aid to cut-off villages, including food supplies. The region includes forty villages, some built with mud, lacking infrastructure. Basic priorities like food and medicine are needed for displaced people.

C22. Emergency shelters and medical treatment for earthquake victims in Marrakech:

Camps have been set up to shelter victims and missing persons in Marrakech, providing treatments in field hospitals or transferring urgent cases to university or military

hospitals. The wounded are receiving treatment in civilian or military hospitals, awaiting medical teams to help them return to normal life.

C23. Reconstruction of Moroccan villages and the need for earthquake resistant building and international aid:

Reconstruction efforts in Moroccan villages post-earthquake are slow due to challenges in reaching the affected areas and a lack of labor. Morocco seeks self-sufficiency in financing, with potential international aid. A focus on earthquake-resistant construction and preserving architectural heritage is crucial. Residents refused to leave homes, emphasizing collective solutions for reconstruction involving all stakeholders. International aid is crucial for relief efforts. The earthquake highlighted the need for faster reconstruction and accurate records. Rescue operations continue in mountainous areas, showcasing the resilience of affected communities.

C24. Post-earthquake rebuilding in Morocco using safe, mixed construction styles and coordinated aid:

After a devastating earthquake in Morocco, residents are rebuilding with government and international aid. Efforts focus on combining modern and traditional construction styles while ensuring safety and compliance with building standards. Challenges include insufficient funds, the coordination of relief efforts, and rebuilding damaged schools. The importance of solidarity, caution against fake news, and early warnings for seismic activity are emphasized. Recovery efforts are ongoing, with a focus on earthquake-resistant engineering and collective decision-making. Residents express gratitude for support but highlight the urgent need for more assistance.

Appendix B.2. Summary of YouTube Comments Sub-Discussions

C1: Religious teachings on morality, and unity:

The conversation focuses on praising Allah, seeking forgiveness, and obeying His commands. It emphasizes repentance, unity, and avoiding sin. The importance of following Allah's guidance, avoiding usury, and treating others justly is highlighted. The message stresses the consequences of disobedience and the need for unity and righteousness among believers.

C2: Religious guidance with social and ethical warnings:

The conversation focuses on praising Allah, seeking forgiveness, and warning against immoral behavior. It emphasizes obedience to Allah and His Messenger, repentance, and avoiding unjust actions. There are references to societal issues, financial ethics, and the need for unity among believers. Criticism of government officials for mishandling funds and neglecting earthquake victims is also mentioned.

C3: Religious guidance on governance, justice, and accountability:

The conversation covers various topics such as governance, wealth distribution, corruption, and the need for repentance and accountability. It emphasizes the importance of obeying Allah and His Messenger, avoiding sin and injustice, and seeking forgiveness. There are warnings about the consequences of disobedience and calls for unity, good deeds, and mercy.

C4: Religious moral teachings and warnings against corruption:

The conversation focuses on praising Allah, seeking forgiveness, warning against immoral behavior, and emphasizing repentance and obedience to Allah and His Messenger. It also addresses issues like usury, bribery, and the importance of unity and good deeds. The consequences of disobedience and the need to fear Allah are highlighted.

C5: Religious principles of righteous conduct and social justice:

The conversation focuses on praising Allah, repentance, obedience, and warnings against disobedience. It emphasizes the consequences of sin; the importance of unity,

kindness, and generosity; and the need to avoid usury and unjust behavior. The message stresses following Allah's guidance, seeking forgiveness, and being just in dealings.

C6: Earthquake aftermath, accountability, and religious reflection:

The conversation discusses the aftermath of an earthquake in Morocco, with concerns about the government's response and allegations of corruption. There are calls for accountability, prayers for the deceased, and solidarity among Arab nations. The conversation also includes references to Quranic verses and pleas for mercy and protection from Allah. Participants emphasize the importance of repentance, obedience, and unity among believers, while warning against disobedience and injustice. The dialog focuses on seeking forgiveness, patience, and healing for all those affected by tragedies, with an emphasis on faith, good deeds, and avoiding division and wrongdoing.

C7: Condolences, prayers, and religious unity:

The conversation focuses on expressing condolences and prayers for those affected by natural disasters, emphasizing the importance of unity among Muslims. There are discussions about obeying Allah, seeking forgiveness, and avoiding sinful behavior. The dialog also touches on social responsibilities, the consequences of disobedience, and the need for repentance.

C8: Prayers, anti-corruption calls, and warnings against injustice:

The conversation covers various topics including prayers for protection, mercy, and blessings for Morocco, calls for accountability and honesty, concerns about corruption and poverty, and warnings against disobedience and injustice. There are also discussions about natural disasters, government officials, and the importance of seeking forgiveness and unity among Muslims.

C9: Solidarity with Algerian disaster victims and calls for justice:

The conversation focuses on expressing solidarity and support for victims of a natural disaster in Algeria, with prayers and calls for unity among Muslim believers. Concerns are raised about the lack of infrastructure and assistance in the affected region, with calls for justice and help from authorities. Prayers are offered for the victims and hope for improved conditions.

C10: Corruption and government neglect in disaster response:

The conversation discusses corruption, neglect, and mismanagement in Morocco, particularly in response to natural disasters. There are accusations of prioritizing the World Cup over citizen welfare, calls for justice and accountability, and prayers for those affected. Solidarity and support among Arab nations are also highlighted. Calls for unity, empathy, and compassion towards victims are emphasized.

C11: Criticism of government corruption and mismanagement:

The conversation involves criticism of the Moroccan government for corruption, mismanagement of funds, and a lack of support for earthquake victims. Allegations of embezzlement and the misuse of international aid are made, with calls for accountability and justice. Concerns about poverty, human rights abuses, and the King's spending on luxury items are also discussed.

C12: Political and social criticism:

The conversation involves users discussing political and social issues in Algeria and Morocco, including corruption, mismanagement, and neglect by government officials. Accusations, insults, and allegations of aid diversion and corruption are prevalent. The conversation also touches on media coverage, housing crises, and the prioritization of events like the World Cup over citizen welfare. Calls for accountability, transparency, and change are made amidst the hostile and confrontational tone.

Appendix B.3. Summary of X Posts Sub-Discussions

C1. Differences in reconstruction funding:

- Period P1 (Before 2024-03-15): Government-led reconstruction program

The reconstruction of areas affected by the Al Hawz earthquake is being funded by a 120-billion-dirham program chaired by King Mohammed VI. The program includes rehousing residents, rebuilding homes, rehabilitating infrastructure, and encouraging economic activities. The government is working on mechanisms to ensure ideal reconstruction conditions.

- Period P2 (2024-03-15–2024-09-14): Regional coordination and acceleration efforts

Regional authorities, institutional actors, and various stakeholders in the Chichaoua region continue to communicate comprehensively and effectively to engage in enhancing the efforts made within the framework of reconstruction at the level of the most affected territorial communities by the Al Hawz earthquake, in order to accelerate the pace of completion of this major workshop.

- Period P3 (2024-09-15–2025-03-14): Human rights advocacy and compensation demands

The Moroccan Association for Human Rights condemned the arrest of the coordinator of the Coordination of the Victims of the Al Hawz earthquake, demanding expedited compensation for all victims and hastening the reconstruction process.

- Period P4 (After 2025-03-14): International praise of the progress, anti-corruption calls, and public protest

The German Ambassador praised progress in reconstruction efforts after the Al Hawz earthquake during a visit with the Moroccan Minister of Equipment and Water. The Moroccan Association for the Protection of Public Funds called for the release of a civil activist sentenced to prison. Victims of the earthquake held protests demanding faster reconstruction support.

C2. Concerns about the delays and transparency in fund management:

- P1: (Before 2024-03-15): Aid distribution and reconstruction focus

Donations for earthquake victims in Morocco are not related to the King. The focus is on reconstruction. Financial aid has been provided to affected families, with different amounts based on the extent of damage to their homes. The aid is being distributed over 12 months, starting in November. The King's role remains respected.

- P2 (2024-03-15–2024-09-14): Protests over reconstruction delays and transparency

Earthquake victims in Al Hawz are organizing a protest due to flaws in reconstruction operations, a lack of government support, and slow progress. They demand transparency in the reconstruction budget and urge for faster construction to alleviate suffering. The government's silence on these issues is criticized, calling for attention from the King.

- P3 (2024-09-15–2025-03-14): Concerns about compensation, misuse of funds

Efforts are being made to rebuild Al-Hoceima after the earthquake, but there are concerns about compensation for victims. Some victims allegedly misused funds meant for rebuilding. Human rights organizations are calling for expedited compensation and reconstruction. There are accusations of corruption and a lack of transparency in the reconstruction process.

- P4 (After 2025-03-14): Uneven reconstruction progress and continued protests

Reconstruction after the Al Hawz earthquake is ongoing but takes time. Victims of the Boumerdas earthquake are still waiting for housing. Most families affected by the

Al Hawz earthquake have returned to suitable housing, but some are still in tents. Activists demanding faster reconstruction have faced legal consequences. Victims continue to protest for more support and reconstruction measures.

C3. Rehousing residents, rebuilding homes, and rehabilitating infrastructure:

- P1 (Before 2024-03-15): Large-scale, King-led reconstruction with international financing

Reconstruction efforts in Al Hawz after the earthquake are being led by King Mohammed VI with a budget of 120 billion dirhams over five years. International partners like the World Bank and the European Investment Bank are also supporting Morocco's reconstruction. Financial aid is being provided to affected families. Agricultural Credit and the European Bank have agreed to finance reconstruction efforts with a program valued at 120 billion dirhams over five years. Plans are in place to host major sporting events in 2025 and 2030 to expand infrastructure. Investments are being made in infrastructure and water sectors, with a focus on technological sovereignty.

- P2 (2024-03-15–2024-09-14): Government borrowing and ongoing struggles and efforts for accelerating reconstruction

Efforts are being made to accelerate the reconstruction process in areas affected by the earthquake in Al Hawz, Morocco. The government has borrowed over one billion dirhams for rebuilding, with stakeholders and organizations actively participating in the reconstruction. Survivors are still struggling a year later, with many buildings needing to be rebuilt.

- P3 (2024-09-15–2025-03-14): Criticizing the arrest of an activist, calling for quick reconstruction

The Moroccan Association for Human Rights criticized the arrest of the coordinator of earthquake victims in Al Hawz, calling for quick compensation and reconstruction. Transparency Morocco released a report on the reconstruction efforts in the area. For more information, visit the provided link. #Lakome #Rights #Earthquake #Reconstruction.

- P4 (After 2025-03-14): High reconstruction completion rate but persistent challenges

Two years after the earthquake in Al Hawz, Morocco, reconstruction efforts have made significant progress. The government, under the leadership of King Mohammed VI, has achieved a 91.33% completion rate in rebuilding houses in affected regions. Despite challenges, the state has provided financial support and social assistance to affected individuals.

C4. Reconstruction support and materials:

- P1 (Before 2024-03-15): Government-led reconstruction with technical and heritage focus

Morocco emphasizes the need for reconstruction after the earthquake, focusing on technical standards and heritage preservation. The Royal Palace announced financial assistance for affected homes. The government is working on mechanisms for ideal reconstruction conditions. Efforts are ongoing in affected regions to support residents and accelerate the rebuilding process.

- P2 (2024-03-15–2024-09-14): Calls to accelerate reconstruction

Supporters of causes abroad are reminded to not forget the earthquake-stricken areas in Morocco like Taroudant and Al Hawz. A fire destroys tents in Al Hawz, prompting calls to accelerate reconstruction. Officials in Chichaoua assure efforts are being made. Various organizations urge active participation in the ongoing reconstruction process. France24 questions the progress of reconstruction one year after the earthquake in Al Hawz.

- P3 (2024-09-15–2025-03-14): Criticism of arrests and asking for justice and transparency

The Moroccan Association for Human Rights criticized the arrest of the earthquake victims' coordinator, calling for quick compensation and reconstruction. They believe the

law favors the rich, as shown by the leader's one-year sentence for advocating for justice and transparency. More information can be found at the provided link.

- P4 (After 2025-03-14): Rapid reconstruction progress under royal directives

  The reconstruction process in the regions affected by the earthquake that hit the region of Al-Hoceima in September 2023 continues rapidly, thanks to the collective mobilization of all stakeholders involved in the implementation of the royal directives.

  C5. Aftermath of the devastating earthquake and call for urgent assistance:

- P1 (Before 2024-03-15): Reconstruction needs and oversight concerns

  The conversation discusses the devastation caused by the Morocco earthquake in the region of Moulay Ibrahim, with a focus on the need for reconstruction and support for affected areas. There are concerns about corruption in the reconstruction process and calls for independent oversight. King Mohammed VI has allocated a significant budget for reconstruction efforts.

- P2 (2024-03-15–2024-09-14): Protests over reconstruction failures

  Victims of the earthquake in Al Hawz are organizing a protest due to flaws in reconstruction operations and lack of support. The government has not admitted failure but remains silent. Algeria distributed 250,000 housing units to its people, contrasting with Morocco's alleged lack of aid to earthquake victims in Al Hawz.

- P3 (2024-09-15–2025-03-14): EU support and accountability issues

  The European Union plans to provide 200 million euros to assist Morocco in earthquake reconstruction. Concerns raised about the misuse of funds, lack of accountability, and inefficient distribution of aid. Calls for responsible building practices and critical evaluation of reconstruction efforts. Emphasis on constructive criticism for the betterment of the country and its people.

- P4 (After 2025-03-14): Disaster preparedness improvements amid corruption allegations

  Morocco is making progress in disaster preparedness with the establishment of 12 regional emergency reserves after the Al Hawz earthquake. The initiative, ordered by King Mohammed VI, aims to enhance the country's capacity to face natural disasters. However, there are allegations of corruption and mismanagement in the distribution of funds and support. Despite challenges, the country is moving forward with reconstruction efforts.

  C6. Reconstruction efforts:

- P1 (Before 2024-03-15): Major state-led reconstruction

  A devastating earthquake in Morocco's Al Hawz region has caused significant loss and destruction, with thousands dead and injured. The government has allocated a substantial budget for reconstruction, with the King overseeing a comprehensive program. The Royal Court has allocated 120 billion dirhams for rebuilding homes, improving infrastructure, and providing aid to those affected.

- P2 (2024-03-15–2024-09-14): Calls to support neglected earthquake-hit regions

  Supporters of causes abroad are urged to remember the earthquake-affected areas in Morocco such as Taroudant and Al Hawz. The government has borrowed over one billion dirhams to rebuild these regions, with a loan agreement of 100 million euros supervised by Fouzi Lekjaa. Aid and support for reconstruction efforts are needed. #Morocco_First #Morocco_Earthquake #Taroudant #Al_Hoceima #Marrakech

- P3 (2024-09-15–2025-03-14): Criticism of slow and ineffective reconstruction in Al Hawz

  The conversation revolves around the failure of the reconstruction and rehabilitation program in areas affected by earthquakes, specifically in Al Hawz. Officials are visiting to

assess progress and discuss challenges faced. Residents are still lacking shelter and services, with speculation about potential ulterior motives behind the slow reconstruction. The role of government neglect, resource distribution, and logistical challenges are questioned.

- P4 (After 2025-03-14): Reconstruction progress praised but funding gaps threaten reconstruction pace

The Ambassador of the Federal Republic of Germany in Morocco praises the progress in reconstruction after the Al Hawz earthquake. However, there are concerns about halted projects due to a lack of international funding, potentially leading to delays in returning to normal life for local residents. Morocco aims to compensate through internal funding or alternative partnerships. The reconstruction efforts in Morocco have been successful, with high completion rates in various regions affected by the earthquake. The government's approach, under the leadership of King Mohammed VI, has been proactive and effective in managing the crisis and providing support to affected individuals. The success of the reconstruction efforts reflects the strength of the Moroccan state and its commitment to protecting its citizens in times of hardship.

C7. Challenges in reconstruction, and international support:

- P1 (Before 2024-03-15): Large-scale, King-led reconstruction backed by international support

The conversation discusses the devastating impact of the earthquake in Morocco, expressing sadness and hope for recovery. The Royal Court emphasizes responsible rebuilding under engineering supervision. The government plans to spend billions on reconstruction efforts. King Mohammed VI chairs a session on the reconstruction program with a budget of 120 billion dirhams. The World Bank President praises Morocco's efforts, and the European Investment Bank will lend one billion euros for reconstruction. Financial aid is provided to affected families, and Morocco is preparing to host major sporting events to develop infrastructure.

- P2 (2024-03-15–2024-09-14): Reconstruction progress with ongoing hardships for survivors

The Al Hawz earthquake affected over 51 thousand families with 42 thousand reconstruction permits issued. Efforts are ongoing to accelerate the reconstruction process in the affected regions. The government borrowed over one billion dirhams for rebuilding. Survivors are still struggling in tents, awaiting reconstruction. Efforts are being made to overcome challenges.

- P3 (2024-09-15–2025-03-14): Calls for transparency and accountability in reconstruction

Reconstruction efforts in the Al Hawz region post-earthquake are ongoing, with some residents expressing dissatisfaction with communication and design choices. The European Union plans to provide financial aid to Morocco for reconstruction. Various organizations and activists are calling for transparency, accountability, and fair treatment in the reconstruction process to address delays and ensure support reaches all affected residents.

- P4 (After 2025-03-14): Continued reconstruction with delays affecting some families

Two years after the earthquake in Al Hawz, reconstruction efforts are ongoing, with progress reported in Al-Hoceima, Marrakech, Chichaoua, and Taroudant. The Moroccan government, under King Mohammed VI's leadership, has prioritized rebuilding homes, schools, and hospitals. However, some families still live in tents due to administrative delays, prompting protests for faster support.

C8. Establishment of regional emergency reserves, and the challenges faced in rebuilding:

- P1 (Before 2024-03-15): Reconstruction program and rejection of exploitative assistance

Morocco rejects assistance from those seeking to exploit the situation. The earthquake in Moulay Ibrahim region caused great sadness, but the affected areas will recover. The King of Morocco reassures by accelerating reconstruction. The reconstruction program includes rehousing, infrastructure rehabilitation, and economic development. Morocco is preparing to host major events to boost development.

- P2 (2024-03-15–2024-09-14): No discussion
- P3 (2024-09-15–2025-03-14): Livelihood of population in temporary accommodations, aid distribution problems and accountability concerns

Temporary accommodation and compensation were provided by the state for earthquake victims, but there are allegations of a contractor stealing money. Concerns were raised about the lack of accountability from officials and the living conditions in tents. The government announced a budget for reconstruction, but there are doubts about the effectiveness of plastic tents in harsh conditions.

- P4 (After 2025-03-14): Disaster preparedness expansion with mixed reactions to reconstruction pace

After the Al Hawz earthquake, Morocco is establishing 12 regional platforms for emergency reserves to enhance disaster response. The project costs 7 billion dirhams and prioritizes national industry. However, reconstruction delays may impact affected areas. Some criticize the government's response, while others praise the country's progress under the King's leadership.

C9. Infrastructure fragility and the reconstruction program:

- P1 (Before 2024-03-15): Reconstruction led by the King and rejection of politically motivated aid

King Mohammed VI chaired a working session on the reconstruction program for areas affected by the Al Hawz earthquake, with a budget of 120 billion dirhams over five years. The program aims to rehouse residents, rebuild homes, rehabilitate infrastructure, and promote economic activities. The King emphasized the need for efficient governance and balanced development.

- P2 (2024-03-15–2024-09-14): No discussion
- P3 (2024-09-15–2025-03-14): Officials' meetings and field inspection, aid distribution issues and accountability concerns

An official delegation visits the leadership of Trois Niaqoub in the region of Al Hawz to follow up on the reconstruction operations in the areas affected by the #Al Hawz earthquake. A field inspection tour of the sites and a closed meeting with the participation of Mohammed Dardouri (the national coordinator of the National Initiative for Human Development) and the governor of Al Hawz, the governor of Chichaoua, and the governor of Taroudant.

- P4 (After 2025-03-14): Disaster preparedness expansion and reconstruction delays

Morocco is progressing in reconstruction after the Al Hawz earthquake, establishing 12 regional platforms for emergency reserves. The country's capacity to face natural disasters is being enhanced, with expected stocks and equipment in place. Reconstruction rates in affected regions are high, showcasing Morocco's effective crisis management and rapid mobilization.

C10. Efforts and challenges to overseeing transparency in the reconstruction process and ensuring efficiency:

- P1 (Before 2024-03-15): Large-scale reconstruction led by the King, challenges and oversight discussions

Morocco is rejecting assistance from those seeking to benefit from the situation after the Al Hawz earthquake. The reconstruction process is facing challenges due to harsh winter conditions, with suggestions to import materials for quick housing construction. Social media is being used to monitor the process, with medical students and professionals providing assistance. King Mohammed VI emphasizes responsible reconstruction efforts, with the government allocating $11.7 billion for reconstruction targeting 4.2 million people. The focus is on rehousing, infrastructure rehabilitation, economic activities, and job creation. The World Bank President praised Morocco's efforts, but concerns remain about the effectiveness and impact of the reconstruction program.

- P2 (2024-03-15–2024-09-14): Calls for support and criticism of slow reconstruction progress

Supporters are urged to remember the earthquake victims in Morocco, particularly in Taroudant and Al Hawz, and to help accelerate the reconstruction process. The government borrowed over a billion dirhams for this purpose. However, there are allegations of budget manipulation and slow progress in reconstruction, leaving many still living in tents.

- P3 (2024-09-15–2025-03-14): Reconstruction progress with community complaints and EU financial support

Reconstruction efforts in Al Hawz region post-earthquake are progressing well, with some complaints from residents in Temsahlucht about poor communication and designs. The European Union plans to provide 200 million euros for Morocco's reconstruction. Various groups and officials are involved in overseeing and criticizing the reconstruction process, highlighting delays and challenges faced by affected residents.

- P4 (After 2025-03-14): Uneven reconstruction outcomes and continued protests for faster support and reconstruction

Reconstruction efforts in areas affected by the earthquake in Al Hawz are ongoing two years later, with progress rates varying across regions. While official reports show significant achievements in rebuilding homes and infrastructure, some families still live in tents due to delays. Protests continue to demand faster support and reconstruction measures.

C11. Classifying and qualifying construction sector:

- P1 (Before 2024-03-15): Reform of Morocco's construction and public contracting sector

The Minister discussed measures to classify and qualify construction companies, improve public contract management, and transition to electronic procedures by 2024. Mr. Nizar Baraka highlighted the importance of the construction sector in Morocco's economy, emphasizing the need for increased public investment to benefit companies and create job opportunities.

- P2 (2024-03-15–2024-09-14): No discussion
- P3 (2024-09-15–2025-03-14): No discussion
- P4 (After 2025-03-14): No discussion

C12. Responsible reconstruction, recovery, and crisis management and temporary solutions:

- P1 (Before 2024-03-15): King-led reconstruction program emphasizing heritage and social development

King Mohammed VI chaired a meeting to discuss the reconstruction program for areas affected by the earthquake, emphasizing the importance of respecting heritage and traditions. The program will include rehousing, infrastructure rehabilitation, and social development. The government allocated funds for financial aid and urgent reconstruction projects. The construction sector is a key contributor to the country's economy.

- P2 (2024-03-15–2024-09-14): No discussion

- P3 (2024-09-15–2025-03-14): Ongoing discussions and concerns about reconstruction and social housing

Discussions about rebuilding Al Hawz after the earthquake and compensating victims are ongoing. There are suggestions to provide social housing apartments in Marrakech to marginalized people. An official delegation visited Trois Niaqoub to follow up on reconstruction. However, there are concerns about the progress of implementing royal instructions and lack of attention to the issue.

- P4 (After 2025-03-14): Progress and challenges in reconstruction and disaster preparedness

Morocco is progressing in the reconstruction after the Al Hawz earthquake, establishing 12 regional platforms for emergency reserves. The project aims to enhance disaster response capacity and draw inspiration from international practices. Despite funding challenges, Morocco has made significant progress in reconstruction, with a focus on sustainable development and efficient crisis management.

C13. Reconstruction challenges, aids and building materials:

- P1 (Before 2024-03-15): Self-reliant, King-led, large-scale reconstruction program and international support

Morocco rejects outside assistance for earthquake recovery, focusing on self-reliance. Suggestions for quick housing using wooden frames and social media monitoring of reconstruction. King Mohammed VI leads $120 billion reconstruction program with Hassan II Fund contributing $2 billion. New agency established for implementation, using debris for reconstruction. Central Bank expects growth improvement with support from World Bank and European Investment Bank.

- P2 (2024-03-15–2024-09-14): Calls for solidarity and reflections on reconstruction challenges

Supporters are urged to remember the earthquake devastation in areas like Taroudant and Al Hawz in Morocco, while also acknowledging poverty within the country. Comparisons are made to Algeria's housing distribution efforts. Reconstruction progress after the earthquake is discussed, with a focus on financial assistance and challenges faced by survivors.

- P3 (2024-09-15–2025-03-14): EU financial support and concerns about reconstruction delays

The European Union plans to provide 200 million euros to assist in reconstruction efforts in Morocco after a deadly earthquake. Despite ongoing work in the region of Al-Hoceima, concerns are raised about the slow pace of reconstruction and the allocation of earthquake budgets. Photos show efforts in the village of Ighilman.

- P4 (After 2025-03-14): Reconstruction progress praised under King's leadership

After the earthquake in Al Hawz, Morocco, reconstruction efforts have been ongoing, with progress in building new houses and providing financial support to affected families. The government, under the leadership of King Mohammed VI, has been praised for its proactive approach and efficient crisis management. Challenges remain, but significant achievements have been made.

C14. Reconstruction program:

- P1 (Before 2024-03-15): King-led comprehensive reconstruction program

King Mohammed VI chaired a session on the reconstruction and rehabilitation program for areas affected by the Al Hawz earthquake. The program aims to rehouse residents, rebuild homes, rehabilitate infrastructure, and accelerate social and economic development. The total budget is 120 billion dirhams over five years, targeting 4.2 million people.

- P2 (2024-03-15–2024-09-14): Government loan to support reconstruction

The government borrows more than one billion dirhams to rebuild earthquake-affected areas. The official newspaper published the decree implementing the loan agreement signed by the government to obtain financing of 100 million euros, with the aim of supporting the reconstruction and rehabilitation program for areas affected by the earthquake in Al Hawz. Fouzi Lekjaa supervised the loan.

- P3 (2024-09-15–2025-03-14): No discussion
- P4 (After 2025-03-14): Progress in reconstruction and expanded disaster preparedness

Morocco is making significant progress in the reconstruction program after the Al Hawz earthquake, with plans to establish 12 regional platforms for emergency reserves. The initiative aims to enhance the country's capacity to face natural disasters and has been praised for its efficient management and rapid mobilization. The royal leadership has played a crucial role in ensuring a successful and timely response to the crisis, reflecting Morocco's commitment to protecting its citizens in times of hardship.

C15. Reconstruction efforts:

- P1 (Before 2024-03-15): Transparency-focused, King-supported reconstruction and economy boost strategy

Morocco rejects exploitation in earthquake recovery efforts, focusing on transparency and accountability. King Mohammed VI donates $100 million for reconstruction. An independent committee is needed for efficient reconstruction in Al Hawz. Training unemployed youth in construction is crucial. The government aims to invest in infrastructure and boost the economy.

- P2 (2024-03-15–2024-09-14): Reconstruction progress with ongoing hardships for survivors

The Al Hawz earthquake affected over 51 thousand families and issued 42 thousand reconstruction permits. Efforts are being made to accelerate the reconstruction process in areas like Taroudant and Al Hawz. However, victims are still living in tents, facing challenges, and demanding faster reconstruction. The government borrowed over one billion dirhams for reconstruction.

- P3 (2024-09-15–2025-03-14): Reconstruction advancing but facing complaints about poor communication and inappropriate designs as well as accountability issues

Reconstruction efforts in the Al Hawz region post-earthquake are progressing well, with complaints from Temsahlucht residents about poor communication and inappropriate designs. The European Union plans to provide 200 million euros for Morocco's reconstruction. Questions arise about delays, mismanagement, and corruption in the reconstruction process, impacting the affected population.

- P4 (After 2025-03-14): Uneven reconstruction progress and public pressure for faster support and praising government's commitment to transparency in reporting

Reconstruction efforts in earthquake-affected areas in Morocco are progressing at varying rates, with significant improvements in housing and infrastructure. The government's commitment to transparency in reporting results is praised, but delays in support for affected families have led to protests in Al Hawz. Overall, progress is being made despite ongoing challenges.

C16. Opportunity reconstruction presents for training unemployed youth in construction:

- P1 (Before 2024-03-15): Large-scale reconstruction program and opportunities for training

The reconstruction and rehabilitation program for areas affected by the Al Hawz earthquake in Morocco will involve rehousing residents, rebuilding homes, and improving infrastructure. With a budget of 120 billion dirhams over five years, the program aims

to target 4.2 million people in six affected regions. The King emphasized the importance of efficient governance and tangible results.

- P2 (2024-03-15–2024-09-14): No discussion
- P3 (2024-09-15–2025-03-14): Questions about responsibility for rehabilitation program failures and delays

  Who bears the responsibility for the failure of the reconstruction and rehabilitation program for the areas affected by the #Houla earthquake after 15 months of the disaster? What is the progress of the reconstruction, shelter, and rehabilitation efforts, and what are the difficulties they face, and to what extent are the infrastructure plans being implemented and the local economy revitalized? Anyone have an answer, please explain to us?

- P4 (After 2025-03-14): No discussion

References

1. Hawkins, C.V.; Wang, X. Policy Integration for Sustainable Development and the Benefits of Local Adoption. *Cityscape* **2013**, *15*, 63–82.
2. Medeu, A.; Askarova, M.; Zhakupova, A.; Bauyrzhan, U.; Klug, H. Sustainable Regional Development: A Challenge Between Socio-Economic Development and Sustainable Environmental Management. *Sustainability* **2025**, *17*, 6020. [CrossRef]
3. UNDRR. *National Disaster Risk Assessment: A Guide for National Practitioners 2025*; UNDRR: Geneva, Switzerland, 2025.
4. Gentile, R.; Cremen, G.; Galasso, C.; Jenkins, L.T.; Manandhar, V.; Menteşe, E.Y.; Guragain, R.; McCloskey, J. Scoring, Selecting, and Developing Physical Impact Models for Multi-Hazard Risk Assessment. *Int. J. Disaster Risk Reduct.* **2022**, *82*, 103365. [CrossRef]
5. Malgwi, M.B.; Fuchs, S.; Keiler, M. A Generic Physical Vulnerability Model for Floods: Review and Concept for Data-Scarce Regions. *Nat. Hazards Earth Syst. Sci.* **2020**, *20*, 2067–2090. [CrossRef]
6. Marin, G.; Modica, M.; Paleari, S.; Zoboli, R. Assessing Disaster Risk by Integrating Natural and Socio-Economic Dimensions: A Decision-Support Tool. *Socio-Econ. Plan. Sci.* **2021**, *77*, 101032. [CrossRef]
7. Lee, S.; Dodge, J.; Chen, G. The Cost of Social Vulnerability: An Integrative Conceptual Framework and Model for Assessing Financial Risks in Natural Disaster Management. *Nat. Hazards* **2022**, *114*, 691–712. [CrossRef]
8. Yeganegi, M.R.; Hassani, H.; Komendantova, N. Social Intelligence Mining: Transforming Land Management with Data and Deep Learning. *Land* **2025**, *14*, 1198. [CrossRef]
9. Wu, S.; Lei, Y.; Yang, S.; Cui, P.; Jin, W. An Agent-Based Approach to Integrate Human Dynamics into Disaster Risk Management. *Front. Earth Sci.* **2022**, *9*, 818913. [CrossRef]
10. Tehler, H.; Cedergren, A.; de Goër de Herve, M.; Gustavsson, J.; Hassel, H.; Lindbom, H.; Nyberg, L.; Wester, M. Evidence-Based Disaster Risk Management: A Scoping Review Focusing on Risk, Resilience and Vulnerability Assessment. *Prog. Disaster Sci.* **2024**, *23*, 100335. [CrossRef]
11. Kyne, D.; Kyei, D. Understanding Associations between Disasters and Sustainability, Resilience, and Poverty: An Empirical Study of the Last Two Decades. *Sustainability* **2024**, *16*, 7416. [CrossRef]
12. Hettige, S. Exploring the Social Effects of Disasters: Causes, Consequences, and Mitigation. In *International Handbook of Disaster Research*; Singh, A., Ed.; Springer Nature: Singapore, 2023; pp. 1637–1645. ISBN 978-981-19-8388-7.
13. Hahn, M.B.; Van Wyck, R.; Lessard, L.; Fried, R. Compounding Effects of Social Vulnerability and Recurring Natural Disasters on Mental and Physical Health. *Disaster Med. Public Health Prep.* **2022**, *16*, 1013–1021. [CrossRef]
14. Finucane, M.L.; Acosta, J.; Wicker, A.; Whipkey, K. Short-Term Solutions to a Long-Term Challenge: Rethinking Disaster Recovery Planning to Reduce Vulnerabilities and Inequities. *Int. J. Environ. Res. Public Health* **2020**, *17*, 482. [CrossRef] [PubMed]
15. Wilson, B.; Tate, E.; Emrich, C.T. Flood Recovery Outcomes and Disaster Assistance Barriers for Vulnerable Populations. *Front. Water* **2021**, *3*, 752307. [CrossRef]
16. Spaiser, V.; Juhola, S.; Constantino, S.M.; Guo, W.; Watson, T.; Sillmann, J.; Craparo, A.; Basel, A.; Bruun, J.T.; Krishnamurthy, K.; et al. Negative Social Tipping Dynamics Resulting from and Reinforcing Earth System Destabilization. *Earth Syst. Dyn.* **2024**, *15*, 1179–1206. [CrossRef]
17. Cremin, E.; Ladd, C.J.T.; Balke, T.; Banerjee, S.; Bui, L.H.; Ghosh, T.; Large, A.; Thi Van Le, H.; Nguyen, K.V.; Nguyen, L.X.; et al. Causes and Consequences of Tipping Points in River Delta Social–Ecological Systems. *Ambio* **2024**, *53*, 1015–1036. [CrossRef]

18. Juhola, S.; Filatova, T.; Hochrainer-Stigler, S.; Mechler, R.; Scheffran, J.; Schweizer, P.-J. Social Tipping Points and Adaptation Limits in the Context of Systemic Risk: Concepts, Models and Governance. *Front. Clim.* **2022**, *4*, 1009234. [CrossRef]

19. Reliefweb. *Morocco Earthquake Disaster Brief, September 2023*; Reliefweb: New York, NY, USA, 2023.

20. UN-SPIDER Knowledge Portal. *2023 Disasters in Numbers—A Significant Year of Disaster Impact*; UN-SPIDER Knowledge Portal: Bonn, Germany, 2024.

21. Government-Kingdom of Morocco. Government Council Meeting on Sunday, September 10, 2023 | Head of Government-Kingdom of Morocco; Government-Kingdom of Morocco. Available online: https://www.cg.gov.ma/fr/node/11394 (accessed on 29 December 2025).

22. Komendantova, N.; Hassani, H.; Yeganegi, M.R.; Al Salaymeh, A.; Qoaider, L. Navigating the Currents: Land Use Challenges Amidst Water and Food Security Debates and Social Media Misperceptions. *Land* **2024**, *13*, 1525. [CrossRef]

23. Hassani, H.; Komendantova, N.; Rovenskaya, E.; Yeganegi, M.R. Unveiling the Waves of Mis- and Disinformation from Social Media. *Int. J. Model. Simul. Sci. Comput.* **2024**, *15*, 2450033. [CrossRef]

24. Microsoft Azure Microsoft Azure Text Analytics API 2023. Available online: https://learn.microsoft.com/en-us/azure/ai-services/language-service/sentiment-opinion-mining/quickstart?tabs=windows&&pivots=rest-api (accessed on 15 December 2025).

25. Ahn, Y.-Y.; Bagrow, J.P.; Lehmann, S. Link Communities Reveal Multiscale Complexity in Networks. *Nature* **2010**, *466*, 761–764. [CrossRef]

26. Kalinka, A.T.; Tomancak, P. Linkcomm: An R Package for the Generation, Visualization, and Analysis of Link Communities in Networks of Arbitrary Size and Type. *Bioinformatics* **2011**, *27*, 2011–2012. [CrossRef]

27. Rani Krishna, K.M.; Somasundaram, K.; Arulmozhivarman, P.; Immanuel, S.A.; Rajkumar, E.R. Deep Learning for Text Summarization Using NLP for Automated News Digest. *Sci. Rep.* **2025**, *15*, 36343. [CrossRef]

28. Zhang, H.; Yu, P.S.; Zhang, J. A Systematic Survey of Text Summarization: From Statistical Methods to Large Language Models. *ACM Comput. Surv.* **2025**, *57*, 1–41. [CrossRef]

29. Yeganegi, M.R.; Hassani, H.; Komendantova, N. Identifying and Mitigating Gender Bias in Social Media Sentiment Analysis: A Post-Training Approach on Example of the 2023 Morocco Earthquake. *Information* **2025**, *16*, 679. [CrossRef]

30. Conneau, A.; Khandelwal, K.; Goyal, N.; Chaudhary, V.; Wenzek, G.; Guzmán, F.; Grave, E.; Ott, M.; Zettlemoyer, L.; Stoyanov, V. Unsupervised Cross-Lingual Representation Learning at Scale. In *Proceedings of the 58th Annual Meeting of the Association for Computational Linguistics*; Association for Computational Linguistics: Florence, Italy, 2020; pp. 8440–8451.

31. Pires, T.; Schlinger, E.; Garrette, D. How Multilingual Is Multilingual BERT? In *Proceedings of the 57th Annual Meeting of the Association for Computational Linguistics*; Korhonen, A., Traum, D., Màrquez, L., Eds.; Association for Computational Linguistics: Florence, Italy, 2019; pp. 4996–5001.

32. Nazaruddin, M. Religious Modeling of a Natural Disaster: A Cultural Semiotic Study. *Chin. Semiot. Stud.* **2024**, *20*, 187–209. [CrossRef]

33. Mohammadnazari, Z.; Mousapour Mamoudan, M.; Alipour-Vaezi, M.; Aghsami, A.; Jolai, F.; Yazdani, M. Prioritizing Post-Disaster Reconstruction Projects Using an Integrated Multi-Criteria Decision-Making Approach: A Case Study. *Buildings* **2022**, *12*, 136. [CrossRef]

34. Li, S.; Sun, X. Application of Public Emotion Feature Extraction Algorithm Based on Social Media Communication in Public Opinion Analysis of Natural Disasters. *PeerJ Comput. Sci.* **2023**, *9*, e1417. [CrossRef]

35. Altanlar, A.; Ceylan, H.; Karamustafa, R.; Kılıç, S.T. Developing Scales for Disaster Risk Perception and Coping: A Psychosocial Perspective. *Nat. Hazards* **2025**, *121*, 19277–19295. [CrossRef]

36. Surjatmodjo, D.; Unde, A.A.; Cangara, H.; Sonni, A.F. Information Pandemic: A Critical Review of Disinformation Spread on Social Media and Its Implications for State Resilience. *Soc. Sci.* **2024**, *13*, 418. [CrossRef]

37. Lühring, J.; Shetty, A.; Koschmieder, C.; Garcia, D.; Waldherr, A.; Metzler, H. Emotions in Misinformation Studies: Distinguishing Affective State from Emotional Response and Misinformation Recognition from Acceptance. *Cogn. Res. Princ. Implic.* **2024**, *9*, 82. [CrossRef]

38. Jain, K.; Achuthan, K. Modeling the Dynamics of Misinformation Spread: A Multi-Scenario Analysis Incorporating User Awareness and Generative AI Impact. *Front. Comput. Sci.* **2025**, *7*, 1570085. [CrossRef]

39. Meretoja, H. The History of Experience, Implicit Narratives, and a Sense of the Possible. *Cult. Hist.* **2024**, *13*, 52–73. [CrossRef]

40. Austin, L.; Fisher Liu, B.; Jin, Y. How Audiences Seek Out Crisis Information: Exploring the Social-Mediated Crisis Communication Model. *J. Appl. Commun. Res.* **2012**, *40*, 188–207. [CrossRef]

41. Shanahan, E.A.; DeLeo, R.; Koebele, E.A.; Taylor, K.; Crow, D.A.; Blanch-Hartigan, D.; Albright, E.A.; Birkland, T.A.; Minkowitz, H. Narrative Power in the Narrative Policy Framework. *Policy Stud. J.* **2025**, 1–16. [CrossRef]

42. Natali, D. The Lesson from America: US Politics and Recent Trends in Contemporary Political Economies. *Ital. Political Sci. Rev. Riv. Ital. Sci. Politica* **2025**, *55*, 200–206. [CrossRef]

43. Kuenzler, J.; Stauffer, B.; Schlaufer, C.; Song, G.; Smith-Walter, A.; Jones, M.D. A Systematic Review of the Narrative Policy Framework: A Future Research Agenda. *Policy Politics* **2025**, *53*, 129–151. [CrossRef]