

# Guardians in the Flood: Unleashing the Roles of Internal Auditors' and Benefits

Mohamad Adzha Haiqal Hassan, Muhamad Aliff Iskandar Azmi, Muhammad Farhan Izzuddin Iskandar, Muhammad Imran Kamaruzzaman, Muhammad Shukri Zazaly, Nor Adila Zulkifli, Muthyaah Mohd Jamil

Faculty of Accountancy, University Technology MARA (UiTM), Selangor Campus, Puncak Alam Branch

\*Corresponding Author

DOI: <https://dx.doi.org/10.47772/IJRISS.2025.908000224>

Received: 29 July 2025; Accepted: 06 August 2025; Published: 04 September 2025

## EXECUTIVE SUMMARY

Malaysia experiences floods repeatedly, especially during the monsoon season, resulting in severe problems such as infrastructural damage, economic impacts, and operational disruptions. This paper aims to investigate the role of internal auditors in managing floods, specifically in assessing risks, allocating and utilizing resources, and preparing for and responding to disasters. Using real-life examples, such as the business interruption at key companies in Malaysia during the 2021 Selangor floods and the flaws in Malaysia's National Flood Forecasting and Warning Program's system, the authors emphasize the importance of further developing internal auditing procedures. The paper suggests that continued internal audit can contribute to establishing organisational resiliency through innovations such as the use of predictive analytics, compliance with ESG regulations, as well as encouraging transparency and accountability during disaster management. However, several drawbacks affect their efficiency; for instance, resource constraints, technological disparities, and the rigidity of implementing new strategies usually slow down the progress of their success stories. Our studies therefore support the call for improved training, efficacy, ethical standards, and appropriate partnership to equip internal auditors to do their work with utmost professionalism and incorruptibility. The following paper provides practical advice to internal auditors on how to revolutionize' flood management practices to enhance organisational sustainability and public credibility. This study will be of great interest and value to readers who have shown interest in internal auditing, disaster risk management, and the construction of resilience.

**Keywords:** Flood Audit, Internal Auditor, Risk, Control, Governance

## INTRODUCTION

The Malaysian government also considers flood as a major threat to communities and organizations during the rainy season from November to the following March. These recurrent disasters lead to huge losses to property, serious interruption of business and physical infractions. For instance, flood incidents in Selangor in 2021 have seen the negative impact of inadequate preparedness with Top Glove Corporation being among those whose operations were greatly affected by flood specific assessments (Hadi et al., 2024).

In recent year, 2024, the flood incidents had cost RM 933.4 million losses as compare RM 755.4 million in 2023 as reported by the Department of Statistics in Malaysia (Rahim, 19 Mar 2025). The losses include the value of damage to the living quarters vehicles, businesses and industrial premises. The losses are equivalent to 0.05% of the country's GDP. The data showed that the cases of floods have become more frequent and severe due to climate change and increased urban development, so it remains the most important issue for organisations and the nation to handle with.

The governments had spent millions of RM as part of assistance for the citizens. However, the Malaysian

government admit that the government have the challenges in the implementing the comprehensive reconstruction plans after post disaster recovery (World Bank Group and Bank Negara Malaysia, 2024). This study belief that the internal auditor can play a significant role in strengthening organizational resistance toward such disasters. Therefore, this paper intends to explore the roles of internal auditors in flood management.

This paper intends to explore whether the participation of internal auditors in flood management in Malaysia. It aims to provide a clear picture to illustrate the role of internal auditors in flood risk management. This paper contributes to academic literature on the involvement of internal audit in flood management. It shows the significant of the internal auditors as the gatekeeper for the any flood management programs. This paper further enhances the roles of internal auditors in the industry.

## **METHODS**

This paper screens out 26 papers for the discussion about the roles of internal audit in flood audits from 2012 until 2025. Papers across the world are use in this study by focusing only on articles related to flood issues and managements. This study focuses more on the discussion about the involvement of the internal auditors in flood audit. The researchers further classify the content analysis in two main discussions on the roles of internal auditors and the befit of flood audit.

### **Role Of Internal Auditors in Flood Audit**

It is undeniably; the role of internal auditors can be extended in the area of flood audits. These papers highlighted the roles of internal auditors stipulated in the three main areas which are risk, control and governance.

#### **Risk**

The Institute of Internal Auditors (IIA) emphasizes that internal auditors should assist management in developing a comprehensive risk map to better prepare organizations for handling environmental hazards, including floods. (Institute of Internal Auditors, 2025) Internal auditors play a vital role in identifying and assessing the risks of flooding. This risk affects the organization's operations and assets. The responsibility of auditor involves evaluating both the direct and indirect impacts of flooding. Direct impacts include physical damage to infrastructure, such as office buildings and IT systems, which often result in increased repair costs. Indirect impacts, on the other hand, encompass supply chain disruptions, operational downtime, loss of income, and reputational damage (Xie et al., 2025).

To address these risks, internal auditors can design an audit framework that identifies gaps in flood risk management strategies, ensuring alignment with national policies and climate change legislation. For instance, in England, where urbanization and climate change have heightened the risk of surface water flooding, there is evidence of inadequate internal audit responses to this issue as stated Russell, McCue, and Patel (2024). These issues arise due to the lack of an audit framework to address water level risks, demonstrate a need for internal auditors to include this critical area in organizational risk mapping.

In Dutch, the the paper written by van Willigen and van Meerveld (2017) describes how Rijkswaterstaat has implemented a comprehensive approach to ensure the reliability and availability of Dutch storm surge barriers. This approach includes adapting ISO and auditing standards to align with best practices in risk management, establishing key checkpoints throughout the risk analysis process to assess the barriers' performance, and introducing a self-auditing system for continuous internal monitoring. These measures ensure that the storm surge barriers, also known as flood wave barriers, are regularly verified for operational readiness, and any issues are detected early to maintain their effectiveness in protecting against storm surges and flooding. The system allows for ongoing performance validation, contributing to the long-term sustainability and reliability of the infrastructure.

In Australia, MIKE 21 hydrodynamic model was used to study the connection between wetlands on the Fitzroy River floodplain and the main river channels. A 30-meter digital elevation model (DEM) derived from the Shuttle Radar Topography Mission (SRTM) was used to replicate the floodplain's landscape and stream networks. Surface roughness values were estimated using a land use map, along with aerial photos and Google Earth images (Karim,2012). The method used in this paper can assist internal auditors in several ways by providing a model for assessing and quantifying environmental risks, specifically in flood-prone areas. This include how hydrodynamic model use to assess floodplain connectivity, which can be adapted to assess risks related to natural disasters. Internal auditors can use similar methods to evaluate an organization's exposure to flood risks and how well existing controls, or mitigation measures are working.

## Control

After a flooding event, internal auditors can evaluate the organization's ability to resume business and minimize losses. Resilience assessment is not just about the response to flood damage, but also an assessment of the capacity of the organization to adapt and recover from future flood events. According to Bang, Miles, and Gordan (2019), resilience assessment is crucial to aid organizations at preparing and responding to frequent flooding events. As a result, the organizations can come up with strategies aimed at restoring operation and overall long-term resilience. The goal of resilience assessment is to identify weaknesses, understand risks, and develop strategies to improve an organization's or community's ability to handle and bounce back from future shocks or stresses. It helps to ensure sustainability in the face of challenges, reducing long-term impacts on people, property, and operations.

Internal audit functions can protect the organization from organizational losses, increase resilience and support business continuity by identifying and assessing flood related risks. The insights provided by internal auditors form the foundation for informed decision-making and effective disaster response strategies, ensuring organizations are better equipped to handle flood- related challenges. Furthermore, internal audits help organizations develop proactive risk management plans, ensuring they have the necessary resources, processes, and protocols in place to mitigate damage before, during, and after a flood event. Through continuous monitoring and assessment, auditors also help refine these plans, adapting them to new risks or changing conditions

For example, the organisation implements Evaluation of Risk Management Control practice. This practice refers to the process of assessing and analysing the effectiveness of an organization's strategies, policies, and practices designed to identify, assess, and mitigate risks. This evaluation helps determine how well risk management controls are working to reduce or prevent potential risks that could harm the organization's operations, assets, or reputation. Internal auditors must assess the organization's contingency planning and disaster recovery strategies to evaluate the effectiveness of existing flood risk management controls (Bankhead, 2020). This evaluation enables the compliance of the controls established with industry standards, which are set as the best practice.

Analysis of various flooding scenarios, test of emergency response plans, as well as verification of adequacy of flood related insurance coverage comprise a complete review of contingency plans (Bankhead, 2020). One important task internal auditor should periodically carry out is reviewing the organization's continuity plan. This allows them to assess whether the organization can maintain its operations and recover efficiently in the event of a flood. Continuity plan in the organization looks at whether the organization has covered the critical aspects that include infrastructure resilience, communication protocols and resource allocation in event of emergencies. The organization integrates ESG consideration to demonstrate its commitment to sustainable and socially responsible practice, and thus increase its resilience against environmental hazards, such as flooding. Additionally, the internal auditor should guarantee that the risk management controls are in sync with Environmental, Social, and Governance (ESG) standards.

## Governance

The findings of this study stress that internal auditors play a role of independent assurance and critical insights, helping the organization prepare for potential flood risks. They can also offer suggested effective control

measures to reduce the risk, therefore increasing the reliability of the entire framework of the organization's risk management. By adopting this proactive approach, internal auditors provide the organization's ability to face various risks in the long term, ensure stability and resilience of its operations.

Internal auditors need to assess the organization's readiness to face potential disruptions (Institute of Internal Auditors, 2025). This includes determining which operations are subject to flooding and assessing the consequences. Early assessments are crucial for minimization of risks, and continuity. For example, in 2021, the floods in Selangor damaged Top Glove Corporation, which is among the leading Malaysian companies. The lack of foresight and flood-specific preparatory stages brought about great disruption in operations. Thus, it is essential for the organization to have proactive planning.

Internal auditors can serve the organization in working on the strategic response (Institute of Internal Auditors, 2025). This might include awareness-training programs for workers, providing adequate insurance coverage for flood-related damages, and flexible work schedules for disruption. Early into these areas, internal auditors can help organizations reduce the potential impact of floods while toughening themselves. For internal auditors, monitoring and observation during the flood are crucial duties. Through these actions, auditors can assess the organization's flood response plan's efficacy in real time. They might suggest quick changes to reduce additional risks by pointing out inefficiencies or vulnerabilities. Internal auditors should also gather information and record the organization's reaction to the flood incident. Creating a thorough audit trail that may be utilized for post-flood assessments requires this information. In addition to facilitating prompt decision-making, efficient monitoring during this stage establishes the framework for long-term flood management advancements (IS Partners LLC, 2023).

Here, internal auditors are responsible for recommending updates and improvements for their business continuity plan, policies, and disaster strategic response based on the data they collect. Internal auditors can help identify weaknesses in business continuity plans and provide guidance to revise and upgrade recovery strategies, protecting operations against future disruptions (Grant Thornton, 2021). Moreover, internal auditors may also collaborate with other departments to assess the damage caused by the flood. Some of the aspects to consider include asset evaluation, operations, and regulatory compliance (IS Partners LLC, 2023). These three elements are critical for ensuring the continuity of business operations during adverse conditions. The discussion continuous with the benefits of the internal audit practices in flood management.

### **Enhancing Social Audit Through Effective Internal Audit Practices: The Benefits**

This report highlights the benefits of the involvement of internal auditors in flood management in Malaysia, supported by actual evidence. The benefits are ensuring effective use of resources, strengthening accountability in financial management, improving flood forecasting and warning systems and enhancing project implementation and monitoring.

#### **Ensuring Effective Use of Resources**

Firstly, internal auditors play a crucial role to identify any inefficiency in resource utilization for flood management. As an example, according to the Auditor-General's report, it states that there are over RM6 million worth of equipment that were purchased for the flood management and mitigation process in Kelantan and Sarawak remained unused due to technical and installation issues (The Edge Markets, 2023). Therefore, to avoid wasting the resources that have been purchased, a regular audit should be conducted to identify any inefficiencies in resource utilization before proceeding to corrective measures. Conducting regular audits can guarantee the flood mitigation projects achieved their objectives and maximizes the use of allocated resources.

Furthermore, the internal auditor also plays a role in assessing whether the allocation of resources aligns with the objectives of the flood management projects. They assess and review procurement activities, project delivery and maintenance procedures to ensure the resources are not only used but also utilized for maximum benefits (Sharma et al., 2022). As a result, the auditors will prepare assessment report that help in facilitating the reallocation of underutilized or misallocated resources to components of the project that are in greater need of support, thereby optimizing the overall resource distribution. This strategic redirection not only maximizes



the return on investment but also significantly enhances the effectiveness, resilience, and long-term success of the flood mitigation initiatives

In a different context, the internal auditors contribute to the flood management process by analyzing past project performances (Liu & Wang, 2021). By analyzing past performance, it will provide insights to resource management in allocating the resources properly. This will lead to more informed decision-making and strategic planning. As an example, studies have revealed that regular audits and reviews of resource allocation will improve the project outcomes for disaster management, emphasizing the importance of these practices in dynamic environments such as flood management.

### **Strengthening Accountability in Financial Management**

Internal auditors help in revealing various cases and incidents of fraud that occur within the flood management projects. As an example, a lack of proper checking on payment to contractors and other irregularities were found, which demand extra attention on issues of transparency and accountability (Medium, 2023). A study highlights that managing audit alarms and preventing an overwhelming number of alerts are important challenges in the implementation of audit process. To address these issues, the internal auditors use data mining techniques to analyse existing data from a well-known database, considering different aspects of the data (Ioannou, Bourlis, Valsamidis, & Mandilas, 2021). Another research presented an actionable framework that combines the techniques of data mining and process mining on one hand, and includes the auditor as a human expert to deal with the typical alarm flood (Jans & Hosseinpour, 2019).

According to a Teammate (Wolters Kluwer) article (2024), internal audit plays a pivotal role in regulatory compliance by overseeing laws, regulations, standards, and internal policies, thus safeguarding organizations from legal fines, reputational harm, and operational disruption. The need for this compliance is crucial for flood management projects which are likely to be funded through public funding and public scrutiny. Research shows that internal audit is crucial in managing financial accountability and risks especially in large complex public infrastructure projects where the issues of transparency are vital. Empirical studies in government settings show strong positive impacts of internal audit on project performance, governance, and financial controls (Middin et al., 2024; Mutabazi & Twesigye, 2022; Momot et al., 2021). Transparency is the main criteria when discussing public financial management. The application of data mining techniques could help in ensure that the management's financial practices comply with established guidelines and regulations as well as play a big part in improving the quality of conducting audit (Ioannou, Bourlis, Valsamidis, & Mandilas, 2021).

The internal auditors act as a verifier for public financial management to various stakeholders. Internal auditors help to provide assurance to various stakeholders such as government agencies, donors and the public that the funds given are being utilized properly towards the flood management projects. Internal auditor will ensure that the financial resources allocated are being effectively utilized, transparent and align with the government objectives and legal frameworks. This independence ensures that the available financial funds are channelled towards appropriate and efficient flood mitigations strategies such as infrastructure development, early warning systems and community-based resilience programs, thus improving the stakeholder's engagement and support for ongoing and future projects (Saad et al., 2024).

Internal auditing enhances the effectiveness of flood visualization tools like MATLAB numerical packages (Beven, Lamb, Leedal, & Hunter, 2015). MATLAB numerical packages is a numerical package that designed to perform numerical computations efficiency. This package helps in data integrity, evaluating control mechanisms, assessing compliance with standards, identifying and mitigating risks, and enhancing reporting and decision-making. Auditors verify the accuracy and reliability of data inputs, assess internal controls to prevent unauthorized alterations, ensure compliance with relevant regulations, identify potential risks such as data breaches or system failures, and provide independent assessments to support informed decision-making. This comprehensive oversight ensures that these tools operate effectively, securely, and in compliance with standards, thereby supporting accurate flood risk assessments and informed decision-making.

## Improving Flood Forecasting and Warning Systems

Internal auditing also provides evidence-based recommendations that could improve the reliability and timeliness of flood alerts' system. There are a lot of available flood alerts' system in the practices. In India, A team of researcher in India have developed a prototype of a smart bridge that integrates sensors to monitor and respond to variables such as water levels, structural deflections, vibrations, and object detection in real time (Kokane & Jadhav, 2025). The sensors employed include flex sensors for deflections, infrared (IR) sensors for object detection, water level sensors, and vibration sensors. In addition to conventional parameter evaluation, the application of modern sensor-based techniques combined with Internet of Things (IoT) control systems provides an enhanced system for monitoring the structural integrity and safety of bridges . In the context of flood management, this smart bridge system plays a crucial role by continuously monitoring water levels and structural conditions. The system can provide early warnings of potential flooding or structural weaknesses. The integration of IoT allows for real-time data collection and analysis, enabling timely interventions to mitigate flood risks and ensure the safety and functionality of bridge infrastructure during adverse conditions.

In the other continent, Philippines, frequent natural disasters like floods and storms pose significant risks due to the country's geographical exposure. To address this, the government has adopted disaster risk reduction and management strategies, including climate change adaptation. A notable initiative is the development of a web-based application, "Anduyog," designed for relief and casualty monitoring and early warning systems for Local Government Units (LGUs). Tested in two case sites, the application met user requirements and proved effective in aiding with early warnings, thereby aligning with recommendations from the Commission on Audit to enhance disaster response capabilities (Rodriguez, Serrano, & Balan, 2017).

These initiatives had open to discuss the needs of the internal auditors is assessing the flood forecasting and warning system. The internal auditors perhaps can highlight the weakness of the system and recommendation to improve it. For example, in Malaysia, the flood alarm system has been developed as part of program under which amounted to RM 145 million (Fazleena & Mazwin, 2023). The system had open a lot of criticism in the internal audit process criticized the accuracy rate of only 5.6 per cent (Fazleena & Mazwin, 2023). Such findings highlight the desire for formal evaluation and improvement of these systems which helped in efforts for technological enhancement.

In different context, the internal auditors also can help in improving the visualization techniques in determing the flood prediction. For instances, a visualization tool has been developed for both a web-based service using Google Maps™ and a desktop application using the Matlab™ numerical packagee (Beven, Lamb, Leedal, & Hunter, 2015). The internal auditors can assess the effectiveness of visualization techniques that help stakeholders understand the range and confidence of flood predictions.

It is no doubt to state that internal auditors play a vital role in enhancing the effectiveness and reliability of early warning used in flood management. They assess the design and implementation of internal controls to ensure that the monitoring systems for water levels and environmental conditions function as intended. By conducting regular evaluations, auditors can identify potential risks such as data inaccuracies, system failures, or unauthorized access, and recommend corrective actions to mitigate these risks. They also ensure compliance with relevant regulations and standards, providing assurance that the smart bridge systems adhere to legal and operational requirements. Furthermore, internal auditors evaluate the integration of Internet of Things (IoT) technologies within the monitoring systems, assessing aspects like data security and the effectiveness of automated alerts. Through their independent assessments, internal auditors contribute to the continuous improvement of flood management infrastructure, enhancing safety, operational efficiency, and resilience against adverse conditions.

### Diagram 1.0: The role of internal auditors and benefits of internal audit in Flood Management

	ROLE OF INTERNAL AUDITORS	BENEFITS OF INTERNAL AUDIT
1.	Assist management in developing a comprehensive risk map.	Ensuring Effective Use of Resources

2.	Evaluate the organization's ability to resume business and minimize losses.	Strengthening Accountability in Financial Management
3.	Play a role of independent assurance and critical insights.	Improving flood forecasting and warning systems.

## CONCLUSION

This paper stands that the involvement of internal auditors are significant in flood management programs. This paper stated that the critical role of internal auditors (IA) in the management of flood risks within Malaysia are identifying risks, assessing controls on risk management, and monitoring project implementation. Their involvement is critical in promoting organizational preparedness, accountability, and sustainability of experiencing repeated occurrences of flood-related disasters. They, therefore, contribute to the optimization of resource utilization by identifying inefficiencies in resource distribution and offering strategic recommendations, which improves the effectiveness of the flood mitigation activities (Sharma et al., 2022). Besides, they also contribute much toward improving the reliability of flood forecasting and warning systems, which, in turn, would reduce the risks and impacts associated with flooding events (Fazleena & Mazwin, 2023).

In order to make internal auditors more relevant in the context of flood management, some improvements are indispensable. Most importantly, constant professional development along with specific training in disaster risk management is necessary so that auditors are abreast of current strategies and technologies (Jones, 2022). It involves familiarization with predictive analytics, compliance requirements regarding environmental, social, and governance ESG criteria and integration with advanced flood forecasting technologies. Second, auditors should promote new auditing frameworks tailored to deal with environmental risks to encourage proactive instead of reactive disaster risk management amongst local authorities. Indeed, the new framework for auditing should integrate risk-based audit approaches that focus on environmental threats and prioritize early detection of weaknesses related to flood mitigation initiatives (Russell et al., 2024). Adopting this proactive approach, auditors can anticipate potential challenges and bring remedial actions into play, thus enhancing the resilience of organizations.

These discussions further emphasize that the internal auditors can contribute to the discussion on sustainable development especially in flood mitigating projects. The findings perhaps can give an idea on the practitioners to customise the role of internal auditors in the organization. It would be better improvement for the paper if there are empirical findings embedded in the discussion. The discussion can be further enhanced in different context or region.

## REFERENCES

1. Bankhead, Z. (2020, March 19). Contingency planning and disaster recovery evaluation [Paper]. ResearchGate. <https://www.researchgate.net/publication/340022008>
2. Bang, H., Miles, L., & Gordon, R. (2019). Evaluating local vulnerability and organisational resilience to frequent flooding in Africa: The case of Northern Cameroon. *Foresight*, 21(2), 208–226. <https://doi.org/10.1108/FS-11-2018-0094>
3. Beven, K., Lamb, R., Leedal, D., & Hunter, N. (2015). Communicating uncertainty in flood inundation mapping: A case study. *International Journal of River Basin Management*, 13(3), 285–295. <https://doi.org/10.1080/15715124.2014.917318>
4. Fazleena Aziz and Mazwin Nik Anis. (2023), The Star - RM145mil National Flood Forecasting and Warning Programme a failure. Retrieved from <https://www.thestar.com.my/news/nation/2023/11/23/rm145mil-national-flood-warning-system-a-failure>
5. Grant Thornton. (2021). Business continuity plans go better with internal audit. <https://www.granthornton.com/insights/articles/advisory/2021/business-continuity-plans-go-better-with-internal-audit>

6. Hadi, F. A. A. K., Sidek, L. M., Salih, G. H. A., Basri, H., Sammen, S. S., Dom, N. M., Ali, Z. M., & Ahmed, A. N. (2024). Machine learning techniques for flood forecasting. *Journal of Hydroinformatics*, 26(4), 779. <https://iwaponline.com/jh/article/26/4/779/100759/Machine-learning-techniques-for-flood-forecasting>
7. Institute of Internal Auditors. (2025). Global practice guide: Developing a risk-based internal audit plan. <https://www.theiia.org/en/content/guidance/recommended/supplemental/practice-guides/developing-a-risk-based-internal-audit-plan/>
8. IS Partners LLC. (2023). The Internal Auditor's Role in Disaster Recovery. Retrieved from <https://www.ispartnersllc.com/blog/internal-auditor-role-crucial-to-disaster-recovery>.
9. Ioannou, A., Bourlis, D., Valsamidis, S., & Mandilas, A. (2021). A framework for information mining from audit data. In *Springer Proceedings in Business and Economics* (pp. 223–242). [https://doi.org/10.1007/978-3-030-57953-1\\_14](https://doi.org/10.1007/978-3-030-57953-1_14)
10. Jans, M., & Hosseinpour, M. (2019). How active learning and process mining can act as continuous auditing catalysts. *International Journal of Accounting Information Systems*, 32, 44–58. <https://doi.org/10.1016/j.accinf.2018.11.002>
11. Jones, A. (ca. 2022). Everything you need for your next disaster recovery audit. IS Partners LLC. <https://www.ispartnersllc.com/blog/everything-need-for-disaster-recovery-audit/>
12. Karim, F., Marvanek, S., Wallace, J., Petheram, C., Ticehurst, C., & Gouweleeuw, B. (2012). The use of hydrodynamic modelling and remote sensing to assess hydrological connectivity of floodplain wetlands. In *Proceedings of the 34th Hydrology and Water Resources Symposium* (pp. 1334–1341).
13. Kokane, S. R., & Jadhav, P. (2025). Real-time monitoring of bridge by using sensor technology with concentration on deflection identification. In *Proceedings of the 2025 1st International Conference on AIML-Applications for Engineering and Technology (ICAET)* (pp. 1–6). <https://doi.org/10.1109/ICAET63349.2025.10932156>
14. Liu, T., & Wang, H. (2021). Resource efficiency in disaster management projects: Lessons from flood-prone regions. *Disaster Science Journal*, 36(4), 355–370.
15. Medium. (2023). Auditor-General's report reveals challenges in Klang's flood mitigation projects. <https://medium.com/@pinangpaspulau/auditor-generals-report-reveals-challenges-in-klang-s-flood-mitigation-projects-ad8b1985b941>
16. Middin, M., Nirwana, N., & Haliah, H. (2024). The role of internal audit in maintaining financial accountability and transparency in government agencies: Literature review. ResearchGate. [https://www.researchgate.net/publication/386387346\\_The\\_Role\\_of\\_Internal\\_Audit\\_in\\_Maintaining\\_Financial\\_Accountability\\_and\\_Transparency\\_in\\_Government\\_Agencies\\_Literature\\_Review](https://www.researchgate.net/publication/386387346_The_Role_of_Internal_Audit_in_Maintaining_Financial_Accountability_and_Transparency_in_Government_Agencies_Literature_Review)
17. Rahim, R. (2025, March 19). Malaysia's flood-related losses surge to RM933.4mil in 2024. *The Star*. <https://www.thestar.com.my/news/nation/2025/03/19/malaysia039s-flood-related-losses-surge-to-rm9334mil-in-2024>
18. Rodriguez, R. L., Serrano, E. A., & Balan, A. K. D. (2017). Anduyog: A web-based application for relief and casualty monitoring and early warning system for local government units in the Philippines. In *TENSYMP 2017 – IEEE International Symposium on Technologies for Smart Cities* (pp. 1–6). <https://doi.org/10.1109/TENCONSpring.2017.8070002>
19. Russell, A., McCue, A. J., & Patel, A. D. (2024). Developing an audit framework for local flood risk management strategies: Is increasing surface water flood risk in England being adequately managed?
20. Saad, M. S. H., Ali, M. I., Razi, P. Z., & Ramli, N. I. (2024). Perspective within the Sendai Framework for Disaster Risk Reduction 2015–2030. Retrieved from <https://journal.ump.edu.my/construction/article/download/10592/3331/42252>
21. Sharma, P., et al. (2022). Optimizing resource allocation through auditing in disaster management. *International Journal of Auditing and Assurance Services*, 14(2), 120–135.
22. TeamMate. (2024, August 28). Internal audit's role in a robust compliance framework. Wolters Kluwer. Retrieved from <https://www.wolterskluwer.com/en/expert-insights/internal-audits-role-robust-compliance-framework>.
23. The Edge Markets. (2023). Auditor-General's report reveals RM6mil worth of unused equipment in flood mitigation projects. <https://theedgemalaysia.com/node/243682>



24. van Willigen, G. R. K., & van Meerveld, H. (2017). Validating the calculated reliability and availability in Dutch storm surge barriers. In D. M. Frangopol, M. T. K. Au, & S. Kim (Eds.), *Life-Cycle of Engineering Systems* (pp. 1459–1468). CRC Press.
25. World Bank Group & Bank Negara Malaysia. (2024). Managing flood risks: Leveraging finance for business resilience in Malaysia. <https://doi.org/10.1596/41223>
26. Xie, M., Qi, S., Dou, Y., & Zhang, X. (2025). Research on the audit rules for national mountain flood disaster survey and evaluation results of key towns and villages. *Water*, 17(6), 773. <https://doi.org/10.3390/w17060773>