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ASSESSMENT OF THE SOCIO-ECONOMIC CONSEQUENCES OF FLOODING ON KANTIN KWARI MARKET, KANO, NIGERIA

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Abstract
Flooding remains a significant environmental challenge affecting urban markets globally, with severe socio-economic consequences. This study examines the socio-economic impact of recurrent flooding on traders, vendors, and customers in Kantin Kwari Market, Kano, Nigeria. Using structured sampling, data were collected from 382 respondents through questionnaires and interviews. The study reveals considerable financial losses, frequent business disruptions, and social vulnerabilities. Financial losses averaged ₦50,001–₦500,000 per event, with traders frequently incurring repair costs and income reductions. Business disruptions include reduced customer traffic (mean = 2.78) and prolonged trading downtimes (mean = 2.72). Social vulnerabilities such as stress and anxiety (mean = 2.48), health challenges (mean = 2.43), and limited government/NGO support (mean = 2.14) exacerbate the plight of traders. The study concludes that recurrent flooding threatens the market's functionality and the livelihoods of its stakeholders The findings highlight the need for improved infrastructure, disaster response systems, and tailored support programs to enhance market resilience.

Keywords: Flooding, Socio-Economic Impact, Urban Markets, Disaster Resilience, Kantin Kwari Market

1. Introduction

Flooding is one of the most serious environmental challenges facing cities around the world. As a natural disaster, floods are caused by factors such as excessive rainfall, inadequate drainage systems or rising water levels (Adedeji, Olufemi and Adeoye, 2020). In many developing countries, flooding is made worse by fast city growth, bad infrastructure, and poor urban planning. These conditions collectively amplify the socio-economic consequences, making urban markets particularly vulnerable (Ibrahim, Usman and Gambo, 2022). These markets, which serve as vital hubs for economic activities, face disruptions in trading, financial losses, and threats to livelihoods when floods occur (Olawale and Adebayo,2019).

Kantin Kwari Market, located in Kano, Nigeria, exemplifies this vulnerability. As one of the largest textile markets in West Africa, it plays a pivotal role in the regional economy by attracting traders and customers from across Nigeria and neighbouring countries (Usman and Gambo, 2022). Unfortunately, recurrent flooding severely threatens the market's operations and the well-being of its stakeholders. Moreover, seasonal floods, often triggered by heavy rains and ineffective drainage, inundate the market, causing widespread destruction of goods and interruptions to trade. In addition to these disruptions, flooding creates hazardous conditions such as water contamination and structural damage for both vendors and customers (Daily Trust, 2022) These challenges are further compounded by the rapid expansion of urban areas and the

construction of structures that encroach on natural waterways, further restricting water flow and heightening the market's susceptibility to floods.

Comprehending the socio-economic impact of flooding in Kantin Kwari Market is crucial to developing effective strategies to reduce its effects. To address these issues, the study will focus on the socio-economic consequences of flooding in Kantin Kwari Market in Kano, Nigeria. It will specifically examine the economic losses, business disruptions, and social vulnerabilities impacting traders, vendors, and customers.

2. Study Area and Methodology

2.1 Study Area

This study focuses on Kantin Kwari Market, situated in the bustling metropolitan city of Kano, Nigeria. The market is strategically located, with Fagge residential area to the north, Singa Market to the east, Ibrahim Taiwo Road to the west, and Kofar Mata residential area to the south (figure 1). Renowned as one of Africa's largest textile markets, Kwari Market offers diverse clothing materials, catering to local and international customers. Positioned at the heart of Kano metropolis—a city with a population exceeding 5 million and an annual growth rate of 3%—the market plays a vital role in the region's economy.

Kano has been a key commercial and industrial hub in Nigeria for decades, drawing millions of visitors and traders from across the nation and neighbouring countries. Its centrality and vibrant trade have solidified its reputation as an economic powerhouse (Nabegu, 2010 in Mahmud, Ali, and Ismail, 2022).

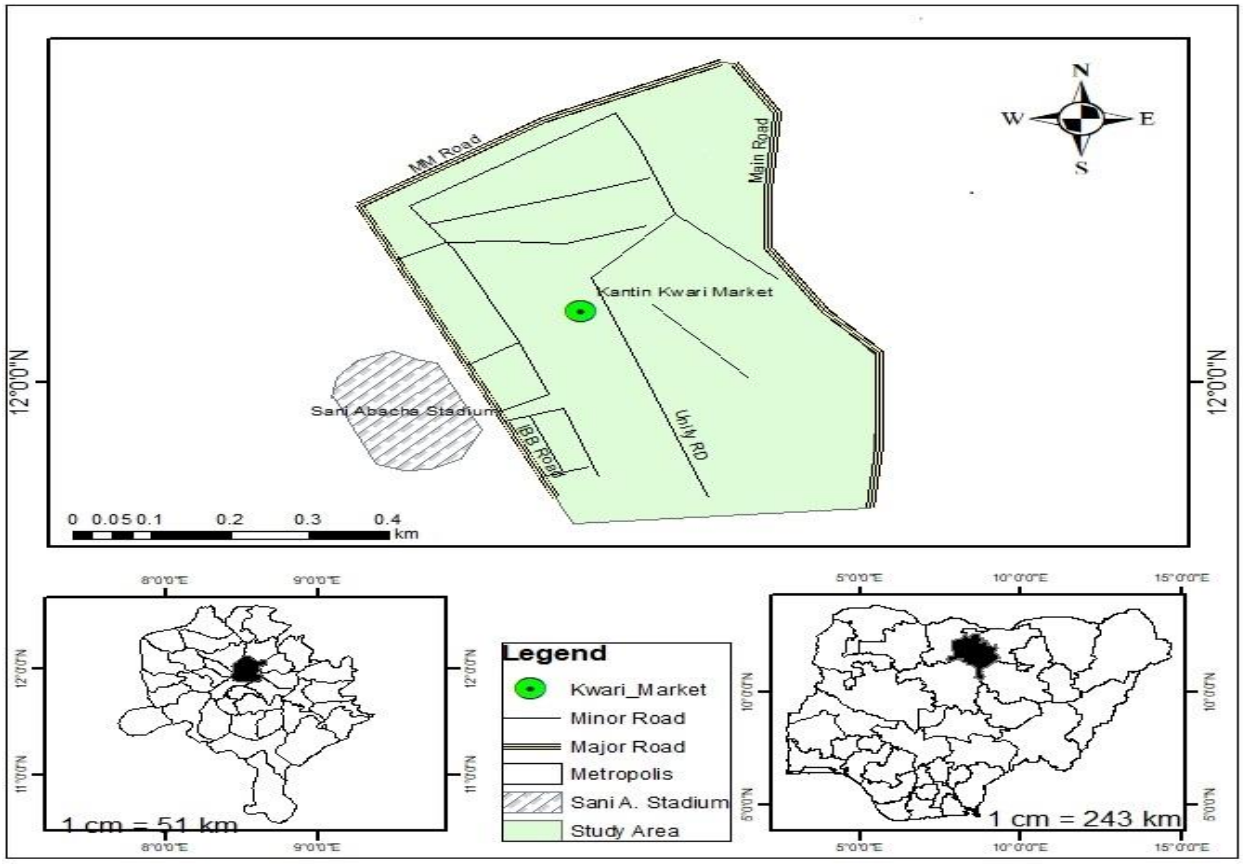

Figure 1: Kantin Kwari Market
Source: USGS Modified Map, 2023

2.2 Sampling Technique and Data Collection Method

This study aimed to achieve its objectives using a structured sampling and data collection approach. The primary goals were to assess the financial losses caused by flooding, examine the disruptions to business operations, and identify the social vulnerabilities of stakeholders within Kwari Market. According to the Kano State Kantin Kwari Management Board, the market hosts a total of 10,157 shops and approximately 30,471 traders (Mahmud, Ali, and Ismail, 2022). It is organized into groups A through J, with each group containing a specific number of shops. Table 1 outlines the total number of shops, traders, and the number of questionnaires administered, as well as the interviews conducted in each section. The sample size was determined using the Yamane (1967) formula for sampling, ensuring that a representative subset of the market population was selected for analysis.

Table 1: Sample Size

S/N	Groups	Number of Shops	Number of Traders	Number of Interviews	Number of Questionnaires
1	A	1,479	4,437	5	62
2	B	1,356	4,068	4	51
3	C	1,023	3,069	3	41
4	D	815	2,445	2	33
5	E	552	1,656	2	17
6	F	1,253	3,759	3	43
7	G	904	2,712	2	34
8	H	1,379	4,137	5	52
9	I	658	1,974	2	19
10	J	738	2,214	2	30
Total		10,157	30,471	30	382

Source: Modified from Mahmud, Ali, and Ismail (2022)

To gather relevant data, a combination of open- and closed-ended questionnaires was utilized. These were distributed to traders using an availability sampling method, allowing the study to capture detailed information about the socio-economic impacts of flooding on their businesses. The questionnaires were designed to identify financial losses, business disruptions, and the social vulnerabilities experienced by stakeholders in the market

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3. Results and Discussion

3.1 Demographic and Socio-Economic Characteristics of the Respondents

Table 2 provides the demographic characteristics of the respondents, insights into the composition of stakeholders at Kwari Market and their socio-economic vulnerabilities to flooding.

a. Sex Distribution

Most respondents in this study were males (91.88%), with females constituting only 8.12%. This disparity reflects the broader gender composition of traders in Kwari Market, where male dominance in trading activities aligns with cultural and societal norms in northern Nigeria. Previous studies, such as those by Adamu and Jibril (2020), have also noted that markets in the region are predominantly male-driven due to traditional gender roles, with women often engaging in smaller-scale informal trading activities. This skewed distribution suggests that interventions targeting traders may need to account for the different socioeconomic roles of men and women in the market. Male traders, as the primary stakeholders, are more likely to face direct economic losses, whereas female traders may experience amplified vulnerabilities due to limited resources and support structures

Table 2: Demographic and Socio-Economic Characteristics of the Respondents (N=382)

Category	Number	Percentage
Sex		
Male	351	91.88
Female	31	8.12
Marital Status		
Single	118	30.89
Married	264	69.11
Age		
Below 20	84	21.99
21-30	96	25.13
31-40	92	24.08
41-above	110	28.80
Level of Education		
Secondary	150	39.27
NCE/Diploma	128	33.51
Degree	85	22.25
Others	19	4.97

Fieldwork, 2024

b. Marital Status

The marital status of respondents shows that a significant majority (69.11%) are married, while 30.89% are single. Married respondents are likely to bear additional financial responsibilities, including supporting families, which may intensify the impact of financial losses due to flooding. Studies by Musa, Abdullahi and Idris, (2021) emphasize that married traders are often more economically vulnerable in the aftermath of disasters because they must prioritize household needs over business recovery. Additionally, marital status influences coping strategies, with married individuals potentially having larger support networks but also greater dependents.

c. Age Distribution

The age distribution reveals a balanced representation across age groups, with 21.99% of respondents aged below 20, 25.13% aged 21-30, 24.08% aged 31-40, and 28.80% aged 41 and above. The significant presence of respondents aged 41 and above (28.80%) indicates the market's reliance on experienced traders who have been in the business for years. These older traders may have established businesses and greater financial stakes, making them particularly susceptible to economic losses from flooding. On the other hand, younger respondents (below 30 years) represent a growing workforce that is more adaptable but may lack the resources to recover quickly from disruptions. Studies by Ahmed and Mohammed (2019) note that younger traders often rely on family support systems and

informal lending mechanisms to rebuild after disasters, whereas older traders may face challenges due to higher fixed costs and long-term investments.

d. **Level of Education**

Educational attainment among respondents varies, with 39.27% having secondary education, 33.51% holding NCE/Diploma qualifications, 22.25% possessing a degree, and 4.97% falling into the "Others" category, which may include minimal or informal education. The prevalence of secondary education as the highest level attained by most respondents reflects the general educational landscape of Kano State, where tertiary education remains less accessible for many. Higher levels of education, as shown in studies by Yusuf, Salisu and Bello, (2020), often correlate with better business management practices and resilience to disasters. Traders with degrees or diplomas may be better equipped to access credit facilities, insurance, or government support, whereas those with lower educational attainment might lack the knowledge or resources to mitigate flooding impacts effectively.

3.2 Economic Losses Caused by Flooding in Kantin Kwari Market

The analysis of economic losses caused by flooding in Kantin Kwari Market is presented in Table 3. The approximate value of goods lost due to flooding had a mean score of 2.49, indicating that most respondents estimated their losses in the range of ₦50,001–₦500,000. This underscores the severe financial burden flooding imposes on traders, as a substantial proportion of their goods are damaged or destroyed during such events. The high cost of replacing lost goods often forces traders to exhaust their savings or borrow funds, leading to further economic strain. Past studies, such as Adamu and Jibril (2020), also highlight the pervasive nature of financial losses in urban markets, attributing them to inadequate drainage systems and the lack of early warning mechanisms.

With a mean score of 2.74, the frequency of losses ranked the highest among the categories, showing that most traders experience financial losses from flooding frequently or always. This high frequency suggests that flooding is a recurring issue in Kwari Market, likely exacerbated by blocked drainage systems, unplanned urbanization, and limited government intervention. Studies by Musa et al. (2021) corroborate these findings, noting that recurrent flooding significantly hampers business sustainability in Nigerian markets.

Table 3: Economic Losses via Flooding

	Category	Question	Responses					
			1	2	3	4	Mean	Rank
1	Financial Losses	What is the approximate value of goods lost due to flooding?	80	112	120	70	2.49	3
2	Frequency of Losses	How often do flooding events cause financial losses?	60	90	130	102	2.74	1
3	Recovery Costs	What is the average cost incurred in repairing shop damages?	100	110	100	72	2.45	4
4	Income Impact	How much has your monthly income reduced due to flooding?	90	95	120	77	2.53	2

Source: Fieldwork, 2024.

Note:
Category (1) 1 = <₦50,000 2 = ₦50,001–₦100,000 3 = ₦100,001–₦500,000 4 = >₦500,000
Category (2) 1 = Rarely, 2 = Occasionally 3 = Frequently 4 = Always
Category (3) 1 = <₦10,000 2 = ₦10,001–₦50,000 3 = ₦50,001–₦100,000 4 = >₦100,000
Category (4) 1 = No Reduction 2 = Reduced by ≤20% 3 = Reduced by 21–50% 4 = Reduced by >50%

The average cost incurred in repairing shop damages had a mean score of 2.45, indicating that repair costs primarily fall between ₦10,001 and ₦100,000. This suggests that flooding not only affects traders' inventory but also damages their physical infrastructure, adding to their financial burden. Repairing these damages often delays business recovery, as traders must allocate a significant portion of their income to restoring shop functionality. Ahmed and Mohammed (2019) also emphasize that high recovery costs reduce the profitability and growth potential of small businesses in flood-prone markets.

The reduction in monthly income caused by flooding had a mean score of 2.53, with most traders reporting a reduction of 21–50%. This indicates a significant drop in income for a majority of respondents, reflecting the broader economic impact of flooding. Reduced income affects traders' ability to reinvest in their businesses, pay workers, and meet personal financial obligations. Olanrewaju et al. (2021) argue that income reductions often push traders into a cycle of poverty, making it harder for them to recover from future disasters.

3.3 Business Disruptions Caused by Flooding

Table 4 presents data on business disruptions caused by flooding in Kantin Kwari market. Customer traffic disruption ranked the highest, with the mean score indicating moderate to significant reductions in visits during flooding events. This aligns with findings in other studies, such as Musa et al. (2021), which reported that flooded markets discourage customers due to unsafe and inaccessible conditions, directly affecting traders' daily sales.

Trading downtime due to flooding had a mean score of 2.72, with many respondents losing over a week of trading time. This disruption reduces income and impacts

inventory turnover. Ahmed et al. (2020) similarly noted that prolonged downtimes are a primary concern in urban markets, requiring immediate interventions like improved drainage and early warning systems.

Delays in stock replenishment had a mean score of 2.61, reflecting the frequent challenges traders face in restocking due to flooded roads or financial strain. Past studies, such as Olanrewaju et al. (2021), emphasize that disruptions in supply chains often lead to unfulfilled customer demand, eroding business competitiveness.

Utility disruption ranked lowest, with a mean score of 2.48, indicating a moderate impact on essential services like electricity and water. While secondary to other disruptions, utility failures amplify challenges by affecting refrigeration, lighting, and sanitation in the market. Yusuf et al. (2020) found similar results, where utility disruptions during floods contributed to unsafe working environments and loss of goods.

Table 4: Business Disruptions Due to Flooding

S/N	Category	Question/Indicator	Responses					
			1	2	3	4	Mean	Rank
1	Operational Impacts	How many days of trading are lost during and after a flooding event?	50	100	140	92	2.72	2
2	Customer Traffic	Have you observed a reduction in customer visits due to flooding?	45	90	150	97	2.78	1
3	Stock Replenishment	How often are you unable to restock due to flooding?	60	110	130	82	2.61	3
4	Utility Disruption	Have utilities like electricity and water been affected during floods?	80	120	100	82	2.48	4

Source: Fieldwork, 2024

Note:
Category (1) 1 = 1–3 Days, 2 = 4–7 Days, 3 = 8–14 Days, 4 = >14 Days
Category (2) 1 = No Reduction, 2 = Minor Reduction, 3 = Moderate Reduction,4 = Significant Reduction
Category (3) 1 = Rarely, 2 = Occasionally, 3 = Frequently, 4 = Always
Category (4) 1 = No, 2 = Minor Impact ,3 = Moderate Impact, 4 = Severe Impact

3.4 Social Vulnerabilities of Traders, Vendors, and Customers

Table 4 reveals significant challenges faced by traders, vendors, and customers during and after flooding events. Psychological stress caused by flooding ranked highest, with a mean score of 2.48, indicating that traders and vendors frequently experience moderate to severe stress or anxiety. Responses show that 31.41% of traders reported moderate stress, while 18.85% faced severe psychological impacts. These stress levels can significantly affect decision-making, productivity, and resilience in the aftermath of flooding. The significant psychological impact of flooding on traders indicates that stress and anxiety are critical challenges affecting work performance. Traders facing repeated disruptions experience uncertainty, reducing their ability to plan and invest in their businesses. The findings align with Ahmed et al. (2020), who identified mental health challenges as a major consequence of recurring natural disasters, emphasizing the need for psychosocial support programs as part of disaster recovery efforts.

Health-related challenges, such as infections caused by exposure to floodwaters, had a mean score of 2.43, with 31.41% of respondents reporting occasional health issues. The data suggests that health risks are a recurring challenge, with many traders incurring medical expenses to treat flood-induced illnesses, further straining their financial resources. The recurring health issues faced by traders due to exposure to contaminated floodwaters are concerning. Medical costs, especially for low-income traders, further exacerbate financial vulnerabilities. Musa et al. (2021) reported similar findings, highlighting that poor sanitation and limited access to healthcare during flooding events disproportionately impact urban traders, reducing their economic resilience. **Table 5: Social Vulnerabilities of Traders, Vendors, and Customers**

S/No.	Category	Question/Indicator	Responses					
			1	2	3	4	Mean	Rank
1	Health Impacts Cost of Medical Treatment	Have you or your family faced health issues (e.g., infections) due to floodwaters?	100	90	120	72	2.43	2
2	Safety Concerns	Have flooding events led to theft or looting of goods?	120	100	110	52	2.25	3
3	Psychological Impact	Have flooding events caused stress or anxiety affecting your work performance?	80	110	120	72	2.48	1

4	Support Systems	Have you received support from the government or NGOs after the flooding?	150	90	82	60	2.14	4
5	Types of Assistance Received	What type of support have you received?	170	70	82	60	2.08	5

Source: Fieldwork, 2024 **Note:1 (No) 2 (Minor), 3 (Moderate), 4 (Severe)**

Safety concerns, including theft or looting during floods, ranked third with a mean score of 2. 25. A significant portion (28.80%) reported occasional theft or looting, highlighting the lack of security measures during and after flooding events. The occasional theft and looting reported during flooding events reflect vulnerabilities in market security. Floods often create opportunities for criminal activity due to the breakdown of law enforcement and the chaotic nature of such events. This finding is consistent with Olanrewaju et al. (2021), who emphasized the importance of deploying security personnel in disaster-prone urban areas to protect assets and maintain order. Support from government or NGOs received a mean score of 2.14, indicating that assistance was rare to occasional for most traders. Nearly 39.27% of respondents reported receiving no support, reflecting inadequate disaster response mechanisms and coordination. The limited support received from government and NGOs underscores gaps in disaster response and recovery mechanisms. Many traders reported either no assistance or infrequent support, highlighting a need for more inclusive and effective relief programs. Yusuf et al. (2020) stressed the importance of integrating local governments and community organizations into disaster management frameworks to ensure timely and equitable assistance. The type of support received ranked lowest, with a mean score of 2.08, suggesting that many traders received either no assistance or minimal aid (e.g., food or financial support). A significant number of respondents (44.50%) reported receiving no support at all, emphasizing the need for more accessible and equitable disaster aid programs. The lack of meaningful support, such as financial aid or shelter, reflects systemic deficiencies in disaster aid systems. Most traders received either no support or minimal relief, such as food assistance, which is insufficient for rebuilding livelihoods. This aligns with the findings by Ahmed et al. (2020), who noted that poorly designed aid programs fail to address the long-term needs of flood-affected communities

4. Conclusion

The study underscores the multi-dimensional socio-economic consequences of flooding on Kantin Kwari Market, revealing a complex interplay of challenges that threaten the

market's functionality and the livelihoods of its stakeholders. Traders and vendors experience substantial financial losses, often ranging between ₦50,001 and ₦500,000 per flooding event, along with significant operational disruptions, including trading downtimes and delays in restocking. These challenges are further exacerbated by psychological stress and anxiety, with many traders reporting moderate to severe emotional strain, which adversely impacts their productivity and decision-making capabilities.

Compounding these issues is the market's inadequate infrastructure, including insufficient drainage systems and encroachments on natural waterways, which aggravate flooding and its associated impacts. Limited external support from government agencies and NGOs further compounds traders' vulnerabilities, with many respondents indicating a lack of meaningful assistance in the form of financial relief, infrastructural support, or psychosocial aid.

Frequent flooding events not only disrupt daily operations but also create a ripple effect, reducing customer traffic and forcing traders to divert resources toward repairs and recovery, leaving little for reinvestment. Health risks associated with flooding, such as infections from contaminated water, amplify the economic strain as traders are burdened with medical expenses. Safety concerns, including theft and looting during floods, further erode the resilience of traders and highlight the need for improved security measures in the market.

These findings point to systemic gaps in disaster preparedness, response, and recovery mechanisms, which leave Kantin Kwari Market and its stakeholders ill-equipped to cope with recurrent flooding.

5. Recommendations

To address the socio-economic consequences of flooding on Kantin Kwari Market, a comprehensive strategy that integrates infrastructure development, disaster preparedness, support systems, health and safety measures, and capacity building is essential.

First, infrastructure improvement is critical to mitigating the immediate and long-term impacts of flooding. Upgrading the market's drainage systems can significantly reduce waterlogging, ensuring that floodwaters are quickly diverted and do not stagnate in the market area. Additionally, enforcing regulations to remove illegal structures that obstruct natural waterways is crucial to restoring proper water flow and preventing future blockages. These measures will not only reduce flooding frequency but also minimize the extent of damage during heavy rains.

Second, disaster preparedness and management must be prioritized to enhance the market's ability to cope with flooding. Establishing an early warning system can help notify traders of impending floods, giving them time to secure their goods and prepare for potential disruptions. A market-specific disaster response plan should also be

developed to address the unique needs of traders, vendors, and customers during and after flooding events. This plan could include evacuation protocols, emergency relief distribution, and post-flood recovery strategies.

Third, support systems are necessary to provide financial and material aid to traders, who often lack the resources to recover from repeated flooding. Introducing microcredit schemes and insurance programs tailored to the specific needs of market traders can offer a safety net, helping them rebuild and sustain their businesses after disasters. Additionally, timely and equitable distribution of relief aid, including financial assistance and essential materials, is essential to ensure that vulnerable traders receive the help they need without delay.

Fourth, health and safety measures should be implemented to protect traders and their families during disasters. Providing access to affordable healthcare services can help address the health challenges posed by flooding, such as infections and waterborne diseases. Moreover, deploying security personnel during and after flooding events is vital to prevent theft and looting, which are common concerns in disaster-affected markets.

Finally, capacity building is a key component of long-term resilience. Organizing training programs on disaster resilience and financial management can empower traders with the knowledge and skills needed to prepare for and recover from flooding. Community-driven initiatives should also be encouraged to foster self-reliance during emergencies, allowing market stakeholders to collaborate and support each other in the face of challenges.

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