ISSN 2354-9114 (online), ISSN 0024-9521 (print)
Indonesian Journal of Geography Vol 57, No.3 (2025): 585-595
DOI: 10.22146/ijg.102773 website: https://jurnal.ugm.ac.id/ijg

INDONESIAN JOURNAL OF GEOGRAPHY

RESEARCH ARTICLE

Now Trending: Social Media and Crowdfunding For Disaster-Stricken Indian Sundarbans

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Received: 2024-12-18
Revised: 2025-03-19
Accepted: 2025-10-02
Published: 2025-12-31

Key words: social media; crowdfunding; cyclone; disaster management; disaster tourism

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Abstract A paradigm shift in disaster risk reduction and management is evident, with social media and crowdfunding playing an important role, even in disaster-prone developing countries like India, with a pronounced digital divide. With the advent of social media platforms coupled with the frequent landfalls of cyclones in the Indian Sundarbans, a climate hotspot has become a classic example of this trio - social media, crowdfunding, and disaster tourism. The main objectives are to bring out the essence of changing the relief donation scenario from traditional donation to modern digital crowdfunding, to assess how far technology and social media, more specifically, have been able to help the eager contributors to take part in the cause of disaster management through hypothesis testing, regression analysis, SWOT analysis, focus group discussions, and perception studies. The empirical research (carried out between 2022-23) based on a semi-structured questionnaire survey involved the stakeholders –donors and beneficiaries. The study notes the nature of social media platform usage, identifies the main driving forces behind opting for specific donation drives, and delves into the underlying reasons for undertaking disaster tourism trips. The study shows that increased use of social media has led to greater acceptance of online crowdfunding initiatives, especially among the younger and educated.

1. Introduction

The United Nations (2007) defined disaster as "a serious disruption of the functioning of a community or a society involving widespread human, material, economic, or environmental losses and impacts that exceed the ability of the affected community or society to cope using its own resources." According to the United Nations Office for Disaster Risk Reduction (UNDRR), disaster-hit countries incurred direct economic losses of around 3,000 billion USD between 1998 and 2017, of which climate-related disasters accounted for 77 percent of the total (Behl & Dutta, 2020).

Disaster management is classified into: a) risk management (undertaken primarily to prevent/minimize disaster impact); b) crisis management (involved with post-disaster response and recovery). Post-disaster reconstruction is a necessity, but often the processes, instead of being entirely positive, are riddled with 'disaster capitalism" Klein (2018) frequently indulging in the extraction and exploitation of the disaster-affected local people to concentrate and consolidate power and resources in the hands of few (Rajasingham-Senanayake, 2005; Gould & Lewis, 2018), and often the tourism industry becomes a part of that nexus (Cohen, 2011; Timms, 2011).

According to the National Institute of Disaster Management (2007), tropical cyclones, a natural disaster, mostly occur in coastal Indian states, including West Bengal. Though improved disaster preparedness, including timely forecasts of approaching cyclones and proper evacuation exercises in the coastal region, has now lessened the risk of loss of human life, the financial crisis remains in the cyclone-hit coastal belt. Especially, disasters affect the backward sections of society the most because there is a positive relationship between disaster occurrence and socio-economic vulnerabilities.

Tourism can be defined as travel undertaken mainly for recreational purposes, excluding academic or journalistic motives; thus, disaster tourism entails travel for predominantly leisure purposes to see areas affected by a disaster (United Nations Office for Disaster Risk Reduction, 2008). Primarily, tourism geographers were more interested in the experiences of those caught in disasters; the first proper write-up on disaster-based tourism was by Fritz & Mathewson (1957) regarding a tornado in White County, Arkansas, in 1952. Research interest in disaster tourism, emphasizing disaster-hit spots termed 'sensation sites' (Rojek & Ury, 1997), gradually emerged as a branch of dark tourism (Lennon & Foley, 2000; Podoshen, 2013; Stone, 2013; Korstanje, 2014). Miller (2008) and Wright & Sharpley (2018) sought to understand how disaster tourism affected tourists and locals who had to overcome the dark gaze. Often, this overtly intrusive behaviour by insensitive tourists has led to irritation among locals (Yusuf, 2020).

In present times, social media and internet news portals have almost overtaken traditional media—such as newsprint, radio, and network television news (Sharpley & Wright, 2018)—through the sharing of experiences, rapid updates, real-time video posts, etc. Social media platforms, with the aid of the World Wide Web, open up opportunities for convergence among donors, insurance professionals, disaster workers,

and researchers for disaster management. In line with this trend, the Sendai Framework for Disaster Risk Reduction (2015–2030) specifically mentions using social media, among other communication channels, to raise awareness and reduce disaster risks. On-location geo-tagged images, real-time communication and updates, information sharing, and the generation of big data help generate awareness and support managerial and humanitarian assistance.

Crowdfunding is a method of raising small amounts of money from many people instead of a large sum from a single individual (Belleflamme et al., 2014; Nordin & Sum, 2020), and it occurs without the presence of financial intermediaries (Mollick, 2014). So, the term 'crowdfunding' emerged from the idea that 'the crowd' means the general public is invited to help specific initiatives by providing resources as much as they can afford. Belleflamme et al. (2014) and Mollick (2014) have described four types of crowdfunding models: equity, lending, reward, and donation-based crowdfunding.

In recent times, the practice of digital crowdfunding has increased manyfold to help produce new products, raise funds for charitable purposes (Kraus et al., 2016), support entrepreneurial activities, and advance political agendas (Moritz & Block, 2016). Raising money through crowdfunding technology to help disaster victims is a relatively new concept (Zhou & Ye, 2018; Mejia et al., 2019). Investors are known as "donors" when they make contributions to donation crowdfunding without any expectation of return, as charity (Carvajal et al., 2012).

Crowdfunding has been common in India through door-to-door fundraising by non-governmental organizations (NGOs), trusts, and foundations for various causes, ranging from meeting personal needs to national calamity management. These offline, direct donations have now changed their form in the digital era, where people use online avenues enabled by information and communication technologies for philanthropic activities. Only a few crowdfunding platforms were operating in India until 2014 (Srivastava, 2016); gradually, many platforms like Impact Guru, Ketto, LetzChange, Small Change, GiveIndia, Milaap, etc. (Marakkath & Attuel-Mendes, 2015; Adhikary et al., 2018; Banerjee et al., 2020) emerged. Nowadays, electronic gadgets have become essential parts of human life, and social media has garnered massive popularity across all age groups in India within a very short span. So, social media is also playing an important role in promoting crowdfunding platforms and their projects, and it is becoming very convenient to maintain connections between donors and recipients of specific initiatives because of the growing accessibility and popularity of social media, specifically Facebook and Twitter (Borst et al., 2018).

Donation-based crowdfunding platforms offering 'philanthrocapitalism' have been the backbone for disaster relief operations (DRO) for marginalized groups, specifically in developing countries. Often, the public who have funded or donated to DRO feel an urge to visit the 'site' to verify progress and also to project themselves as 'philanthropists working at ground zero' in their social media circles to gain recognition and popularity. This trend has been recognized as disaster tourism, a part of 'dark tourism' ventures.

McKinsey & Company (2019) reported that India is the second-largest and fastest-growing market for digital consumers, with 560 million internet subscribers in 2018, and that the highest mobile data consumption is ushering in a digital revolution. Suresh et al. (2020) emphasized the vast potential for crowdfunding in India's emerging markets. Banerjee (2020), in her doctoral dissertation, presented an account of crowdfunding platforms and investigated the relationship between Indian 'micro-philanthropists' and local NGOs. The role of crowdfunding might not be limited to post-cyclonic events but can also be of great help in the judicious use of space (Rachmawati & Budiarti, 2016), so that local vulnerable groups can be saved from the wrath of cyclonic storms.

The two basic objectives of the study are to evaluate how the increasing usage of digital media platforms has impacted the habit of disseminating disaster updates and initiating relief operations, and to assess how far digital crowdfunding has made inroads as a viable way of disaster management in terms of reach and acceptability both amongst the contributors and beneficiaries.

2. Study Area

The Sundarbans, a UNESCO World Heritage Site (World Bank, 2013) and the world's largest contiguous block of tidal halophytic mangrove forest (approximately 10,200 sq. km), is located on the deltaic floodplains across Bangladesh and India. The Indian part of the Sundarbans has a total of 19 CD

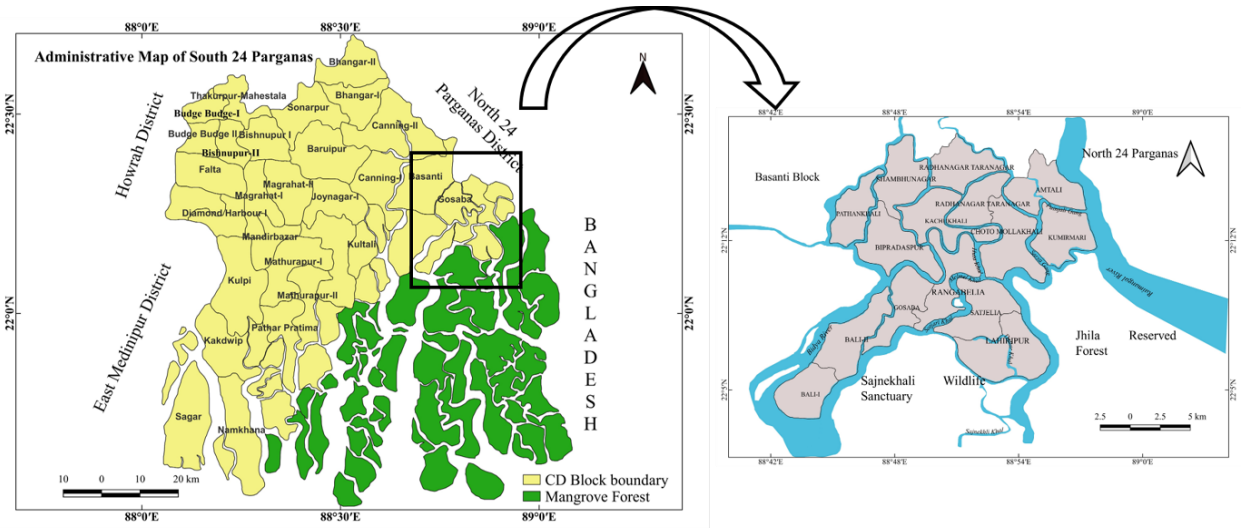


Figure 1. Delineating the study area - Gosaba, West Bengal, India.

blocks covering portions of the South and North Twenty-four Parganas districts, with a geographical area of 4,266.6 sq. km, and the remaining 5363 sq. km is reserved forest. The study has been conducted in the Gosaba block (296.43 sq. km) of South Twenty-four Parganas, which has a total of 14 Gram Panchayats (GP) and 50 inhabited villages administered by the GPs (Fig 1); out of which 7 forest-fringe villages and 11 inland villages have been selected for primary survey. The Gosaba CD block, selected as a priority block, has a unique feature: the southern side is mostly bordered by forest (wildlife sanctuary, reserve forest), which adds to its remoteness.

Several scholars have presented scientific evidence to establish that the Sundarbans have been facing the wrath of climate change over the last few decades, affecting the daily lives of islanders (Pachauri et al., 2014; Hazra et al., 2010). The factors that have been put forward as representative of the changing scenario are rising temperatures, erratic rainfall, sea-level rise, and an increasing frequency of cyclone incidents (Danda et al., 2011), leading to growing numbers of ecological refugees. Back in 2011, the Government of India declared the Indian Sundarbans a Critically Vulnerable Coastal Area, which needed a comprehensive management plan through a participatory planning approach involving the local community to tackle the vulnerabilities of the communities. (Das Gupta & Shaw, 2014). As the study involves donors to the crowdfunding initiatives for the study area, the Gosaba region—residents of Kolkata, the metropolitan city of West Bengal — has also been considered for the holistic analysis.

At the outset, no prior study has been conducted in the Sundarbans area on cyclone disaster management using digital platforms. Though internet penetration in the interior of the islands has been achieved and the villagers are accustomed to digital social media, no such contemporary observations have been documented. Disaster tourism, another new dimension with dual bearing on the disaster management scenario, now rampant in the region, has also been overlooked academically. Besides, all the stakeholders, fund seekers, promoters, felicitating platforms/service providers, donors/contributors, and regulators are taken into account for the holistic approach, which has generally not been attempted by many.

3. Methods

The materials used are satellite imagery (Landsat 8 OLI images); secondary data from various government documents, such as the Census of India, 2011, the West Bengal Annual Flood Report (2019 and 2021), and the Socio-economic Caste Census 2011; and several other books and articles for contextualizing the study. Besides, questionnaires are used to schedule surveys and interactive discussions with respondents to collect primary data and first-hand experience.

The empirical study is based on a semi-structured questionnaire schedule survey February 2022 to January 2023, involving the stakeholders—donors in crowdfunding (sample size of 200 from Kolkata city and its suburban region)—based on snowball sampling and the beneficiaries, i.e., the cyclone-affected villagers of Gosaba block of South 24 Parganas (approximate sample size of 120, which is approximately 0.5% of the total population of the block from each Gram Panchayat)—based on stratified random sampling (Fig 2).

From the donors' schedule, the variables taken into account are regarding respondent's socio-economic information like respondent's age, place of residence, gender, educational qualification, occupation etc. and aspects related to crowdfunding and social media where respondent's information related to accessibility to internet facility as well as social media and his/her participation in crowdfunding project specially crowdfunding initiative for post-disaster relief operations in Indian part of Sundarban were gathered.

For the recipients' schedule, the variables considered are about general socio-economic information of the villagers like their age, caste, educational qualification, occupation, income, type of their house and its distance from the nearest river etc., along with information regarding their accessibility to social media, conception about crowdfunding, its impact on their social as well as economic condition and perceived future prospect of crowdfunding initiatives in post-disaster management.

Quantitative data has been analyzed through Microsoft Excel 2010 and IBM SPSS v23.0, and GIS-based spatial mapping has been done using QGIS v3.22.16, while the qualitative aspect is studied through in-depth interviews conducted with the donors and recipients of donations (Fig 3).

The expressions involved for quantitative analysis are: a) Graphical Representations - Using bar graphs and pie charts, b) Statistical Analysis – involving i) Descriptive Statistics - Mean, mode, median, and standard deviation ii) Inferential Statistics – Regression Analysis (bi-variate and multi-variate) and Test of Hypothesis (ANOVA and Chi Square). c) GIS-based Spatial Mapping - GIS-based thematic map, heat map, etc. The qualitative methods involved are: a) In-depth interviews have been conducted with donors and NGO representatives to create a profile and to identify the main driving forces behind opting

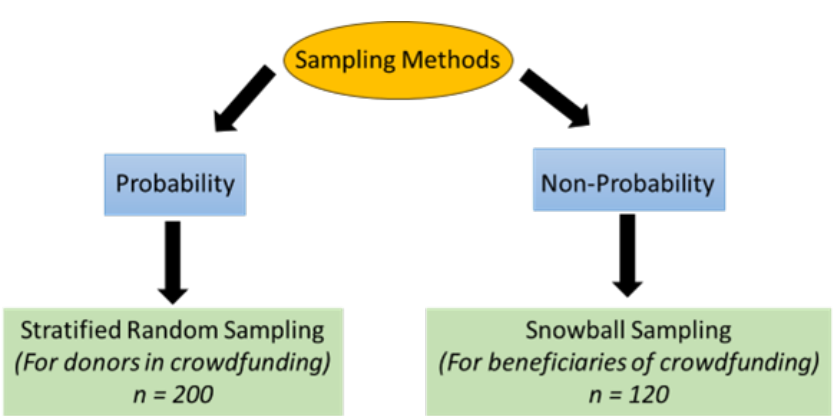


Figure 2. Outline of basic sampling methods followed for the study.

for a specific donation drive, like acuteness of the disaster, authenticity of the information available, background of the agency involved in the collection, and behavioural intentions. b) Survey to get details about demographic, socio- economic characteristics, and disaster-related observations. c) Narrative Analysis to understand how research participants construct stories and narratives from their own personal experience. d) Autoethnography to understand the social phenomena behind the behaviour of the respondents. e) Case Studies have been conducted along with the NGO representatives to understand their overall contribution and motive behind their operation in the study area. f) Focused Group Discussion (FGD) has been conducted at two points: one at Kumirmari village, where the quality of life of the residents is dreadful, apart from being victims of cyclonic wrath, tiger attacks are also very common as they undergo their regular livelihood chores, and the second one was at Gosaba with the members of the local gram panchayat. In both cases, the point of discussion was the role of social media, crowdfunding, and disaster tourism. Triangulation was incorporated to balance out the diverse views.

4. Results and Discussions

Gosaba has a population density of 830 people per sq. km; 63% of the population are caste-wise backward; 73.9% are dependent on agriculture; and 44% of the total population is still reeling below the poverty level (Census of India, 2011). Climate-induced natural disasters are recurrent phenomena in

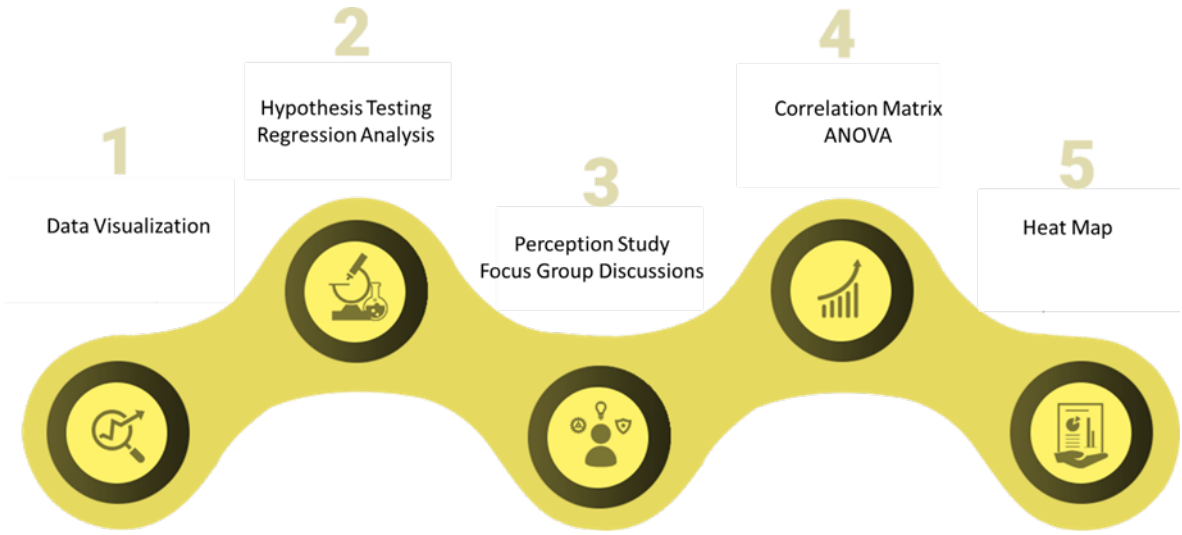


Figure 3. Research method workflow of the study conducted.

Table 1. Indicators selected to identify the village cyclonic-disaster vulnerability, Gosaba, West Bengal, India

ID	Indicators	Unit of Measurement	Data Source
X1	Length of embankments Slip/ Subsidence/ Erosion (m) due to cyclone BULBUL (2019)	Percentage	West Bengal Annual Flood Report 2019
X2	Length of embankments Slip/ Subsidence/ Erosion (m) due to cyclone YAAS (2021)	Percentage	West Bengal Annual Flood Report 2021
X3	Population density per sq. km	Number	Census Digital Library, Office of the Registrar General & Census Commissioner, India
X4	HH's Cultivation as the main source of income	Percentage	Socio-economic Caste Census 2011
X5	Socially disadvantaged People (ST and SC Population)	Percentage	Socio-Economic Caste Census 2011
X6	Deprived HHs (one room, kucha wall-roof, no member 16-59 years)	Percentage	Socio-Economic Caste Census 2011
X7	HHs with only one room with kucha walls and kucha roofs	Percentage	Socio-Economic Caste Census 2011
X8	HHs with no literate above 25 years	Percentage	Socio-Economic Caste Census 2011
X9	HHs with less than Rupees 10,000 (around 118 USD) Income	Percentage	Socio-Economic Caste Census 2011
X10	HHs without Electricity	Percentage	Socio-Economic Caste Census 2011
X11	HHs with the location of drinking water away from premises	Percentage	Socio-Economic Caste Census 2011
X12	HHs are not have a latrine facility within the premises	Percentage	Socio-Economic Caste Census 2011

**HH stands for Household*

Source: Compiled by the author

this deltaic block, making it climatically as well as economically vulnerable, with 87% of the total population still struggling with food shortages (Ghosh & Mistri, 2020). Several factors make the coastal block climatologically as well as socio-economically vulnerable, out of which twelve (12) factors have been chosen (Table 1) under the broad category of physical, demographic, and socio-economic.

A Principal Component Analysis (PCA) has been run to identify the most influential factors among the chosen 12 factors based on eigenvalues and the varimax rotation. Length of embankments Slip/ Subsidence/ Erosion (m) due to cyclone BULBUL (2019) is found to be the most significant indicator, followed by deprived HHs (one room, kucha wall-roof, no member 16-59 years), HHs with less than Rupees 10,000 Income, and HHs without Electricity (See supplementary data file for details).

3.1 The Donors' Side

In India, donation- and reward-based crowdfunding platforms are legal and authorized by the Securities and Exchange Board of India. For societal causes, fundraising is the process of gathering voluntary contributions of money or other resources carried out by non-profit-making organizations — NGOs, charitable foundations, collectives, etc. — with a desire to make a difference, which may or may not have registration. Donors may also be eligible for tax benefits when contributing to approved charitable organizations under Section 80G of the Income Tax Act, 1961.

The analysis of donors' profiles (across age brackets and economic strata) has been conducted to understand how the civil society of Kolkata city (the nearest metropolitan city to the Indian Sundarbans area) is involved in such initiatives to disseminate aid and donations. 75% of the respondents were permanent residents of Kolkata and the suburbs. Out of the rest, 8% were temporarily residing outside West Bengal, 10% were currently residing abroad, and 7% were Non-Resident Indians. 55% were male donor respondents, and 45% were female donor respondents. Interestingly, the educational qualification of the respondents was on the higher side, indicating that with education (24% being graduates and 41% being postgraduates), awareness about various donation-accepting platforms is created more. There is a predominance of service holders, both government and private, among the respondents; however, there is a healthy presence of the student community, which points to the bright side that the younger population is interested in social work.

Almost 56% of the respondents have regular involvement in social work. 45% are involved in NGO activities, while 28% rely on individual efforts that are either closely related or grassroots. Most of them (63%) were inclined to participate in relief-related activities, as they believed that, since disasters are sudden events causing mass destruction, the need for help is high. However, awareness of crowdfunding is not widespread. 44% of those who had no idea about crowdfunding said that the main reason was a lack of information; otherwise, they would have also contributed. There were few (11%) who themselves are participants or promoters of crowdfunding. 50% of the respondents, in line with current times, operated only online, while 34% kept both traditional offline and modern online channels open for donations. 69% admitted they preferred online transactions because they are less time-consuming and hassle-free, but a whopping 83% checked the authenticity of crowdfunding platforms before donating.

A correlation coefficient has been calculated among respondents' age, their annual family income, involvement in any social service, participation in any crowdfunding projects, mode of participation in any donation-based activities, and change in opinion regarding donation contributions with the use of social media (Table 2). The study reveals that the respondent's age has a negative correlation with involvement in any social activity but a weak positive correlation with participation in crowdfunding projects, the mode of involvement in donation-based activities, and a change in opinion regarding donation contributions with the use of social media. Matanji (2019) explored how age influences the acceptability of digital crowdfunding in Kenya and found results similar to those reported elsewhere. Family income is positively correlated with involvement in any social service and participation in crowdfunding projects.

When one talks about online mode, the question of involvement with social media inevitably arises. It is mostly through avenues like WhatsApp, Facebook, YouTube, Twitter, etc. that one gets updates, ways to donate, and even ways to share that news to create further awareness. 96% of respondents were familiar with social media; the older age group was mostly the one that still shied away from it. Facebook, YouTube, and WhatsApp were the most commonly used platforms, and 75% of respondents accessed them through their Android mobile apps. The frequency of use of these social media platforms is quite high, and 57% admitted they are rather addicted to them. 58% also revealed that, since the COVID lockdown, the tendency has increased by leaps and bounds. It is also heartening to note that 77% of the respondents follow and share news and updates regarding disasters at various spatial scales, which provides the initial impetus to be part of the disaster recovery process. But this has not translated much into setting up their own crowdfunding initiatives (only 10%), as most joined the bandwagon as donors only. For that, two pull factors are very prominent: 52% prefer to contribute to initiatives set up by their own people, and 31% prefer to join an already established crowdfunding agency. Over 90% were very upbeat about the future of this combination of social media and crowdfunding and hope that, over time, it will become more organized, professional, and flourishing.

Firstly, an attempt was made to determine whether education has any bearing on participation in fundraising activities for the cyclone-stricken Indian Sundarbans. For carrying out a one-way ANOVA test (Tables 3a & 3b), the hypotheses taken into account were:

H0 = There is no statistically significant difference in the mean participation of respondents in any fundraising activity for the cyclone-stricken Sundarbans, irrespective of their educational qualification.

H1 = There is statistically significant difference in the mean participation of respondents in any fundraising activity for the cyclone-stricken Sundarbans irrespective of their educational qualification.

A one-way ANOVA is used to evaluate the impact of the predictor variable (respondents' educational qualifications) on the response variable (respondents' participation in any fundraising activity for the cyclone-stricken Sundarbans). There is no statistically significant difference in the mean involvement of respondents in any fundraising activity for the cyclone-stricken Sundarbans irrespective of their educational qualification, which is taken as the null hypothesis (H0), and there is a statistically significant difference in the mean

Table 2. Correlation matrix considering several factors related with donors from in and around Kolkata city, West Bengal, India

Correlations

		Respondent's age	*Family income per annum (in Rs.)*	*Involvement with any social service*	*Participation in any crowdfunding projects*	*Mode of involvement in any donation-based activities*	*Changed opinion regarding donation contribution with the usage of social media*
Respondent's age	Pearson Correlation	1	.227**	-.024	.112	.031	.078
	Sig. (2-tailed)		.001	.738	.114	.749	.275
	N	200	200	200	200	112	200
Family income per annum (in Rs.)	Pearson Correlation	.227**	1	.292**	.314**	-.153	.045
	Sig. (2-tailed)	.001		.000	.000	.108	.527
	N	200	200	200	200	112	200
Involvement with any social service	Pearson Correlation	-.024	.292**	1	.546**	-.044	-.167*
	Sig. (2-tailed)	.738	.000		.000	.648	.018
	N	200	200	200	200	112	200
Participation in any crowdfunding projects	Pearson Correlation	.112	.314**	.546**	1	-.106	-.297**
	Sig. (2-tailed)	.114	.000	.000		.264	.000
	N	200	200	200	200	112	200
Mode of participation in any donation-based activities	Pearson Correlation	.031	-.153	-.044	-.106	1	.098
	Sig. (2-tailed)	.749	.108	.648	.264		.305
	N	112	112	112	112	112	112
Changed opinion regarding donation contribution with the usage of social media	Pearson Correlation	.078	.045	-.167*	-.297**	.098	1
	Sig. (2-tailed)	.275	.527	.018	.000	.305	
	N	200	200	200	200	112	200

***. Correlation is significant at the 0.01 level (2-tailed).*

**. Correlation is significant at the 0.05 level (2-tailed).*

Source: Computed by author based on Primary Survey, 2023

Table 3a. Calculating One-Way ANOVA for analyzing participation based on educational qualification in any fundraising activity for the cyclone-stricken Sundarbans

Participation in any fundraising activity for the cyclone-stricken Sundarbans

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Higher Secondary	17	.29	.470	.114	.05	.54	0	1
Graduate	42	.43	.501	.077	.27	.58	0	1
Post Graduate	82	.65	.481	.053	.54	.75	0	1
Above	48	.69	.468	.068	.55	.82	0	1
Others	11	.45	.522	.157	.10	.81	0	1
Total	200	.57	.496	.035	.50	.64	0	1

Source: Computed by author based on Primary Survey, 2023

Table 3b. Calculating One-Way ANOVA for analyzing participation based on educational qualification in any fundraising activity for the cyclone-stricken Sundarbans

ANOVA					
Participation in any fundraising activity for the cyclone-stricken Sundarbans					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3.421	4	.855		
Within Groups	45.599	195	.234	3.658	.007
Total	49.020	199			
Result: Null hypothesis rejected at 5% significance level.					

Source: Computed by author based on Primary Survey, 2023

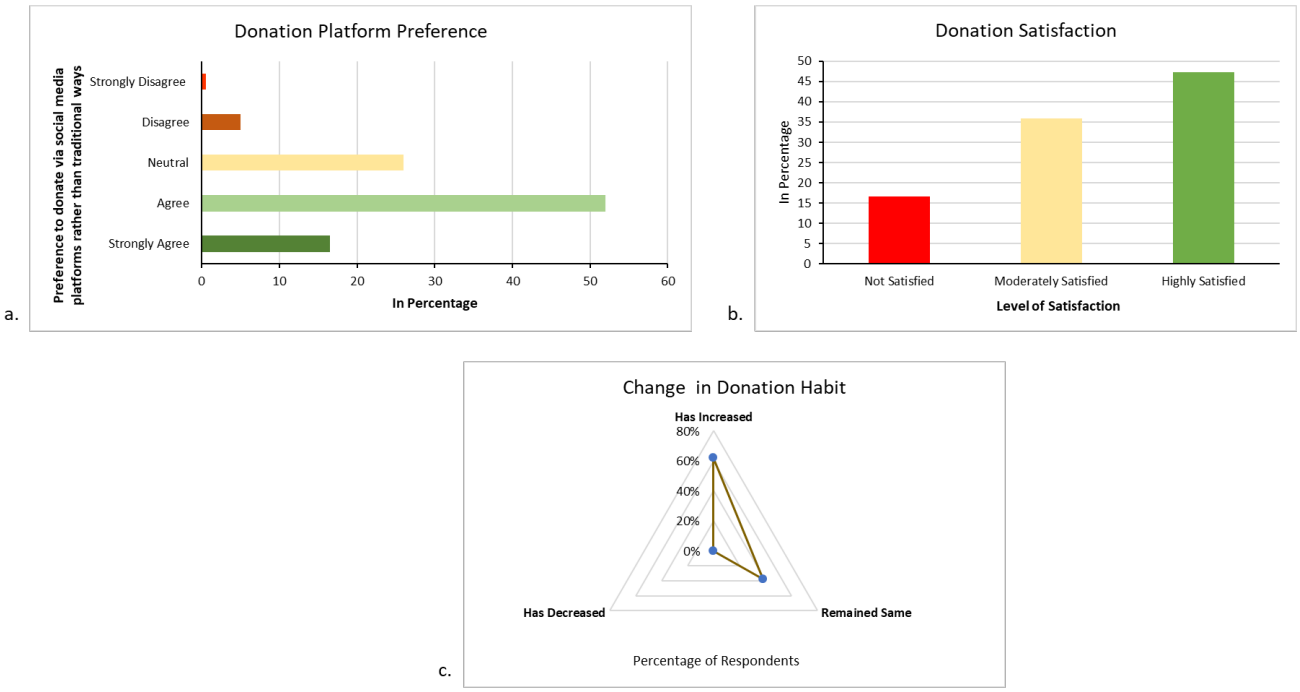


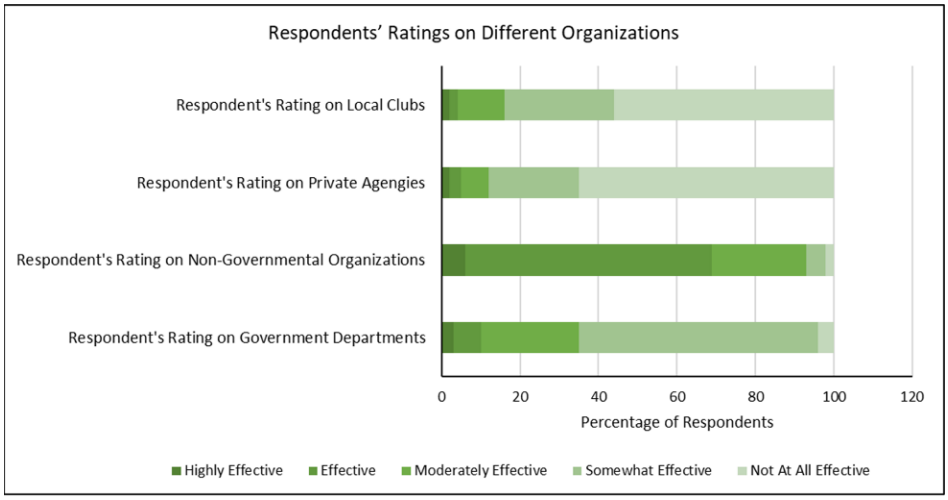
Figure 4. a) Respondents' view on changing pattern of donation making, b) Respondents' satisfaction level after donating, c) Donors' habit of donation making over time. Data Source: Primary Survey, 2023

participation of respondents in any fundraising activity for the cyclone-stricken Sundarbans irrespective of their educational qualification, which is taken as the alternative hypothesis (H1). Here, the p-value (.007) is less than the 0.05 significance level, which rejects the null hypothesis and establishes the result as statistically significant, i.e., education influences participation in crowdfunding initiatives. According to the donors, the habit of donating has increased with greater internet access and the availability of social media platforms. Most respondents (68%) favoured the modern method of donation via social media. Being part of the donation drive has given a positive boost to the majority, and only a small section (16%) did not like the outcome of their donation or felt duped. Thus, no respondent reported that their donation-making behaviour has decreased with the advancement of digital technology and crowdfunding platforms (Fig 4). The findings are in line with the study of Behl & Dutta (2002) who stated that some other advantages of using crowdfunding technology in post-disaster relief operations are the dissemination of information to a large population very fast; live sharing of exact details about the location, degree of damage, etc., along with regular, systematic updates regarding the initiatives taken for the victims with the funds accrued through crowdfunding.

While donating, reliance on NGOs was heavy (66%), followed by government agencies (25%); though most agreed that local people who face the wrath of natural disasters are the best persons to deal with the situation, when it comes to entrusting them with donations, the situation was not very heartening as there was a lack of acquaintance and credibility. Respondents are not really satisfied with any of the organizations regarding their disaster management activities; still, the respondents believed the government departments and NGOs' fund utilization to be more trustworthy and effective, which explains their donation pattern (Fig 5). 79% of the respondents were aware of the term' disaster tourism,' and 92% of them refused to get labelled as disaster tourists as they felt there was a negative connotation attached to it. But at the same time, 76% admitted they posted updates/pictures about their disaster-related visits and donation activities on social media. So, the contradiction was quite evident.

3.2. The Donation Recipients' Side

Though respondents were spread over a wide age range, 76% belonged to the age bracket between 30 and 60 years, i.e., the working age group. The male-female ratio was the same,



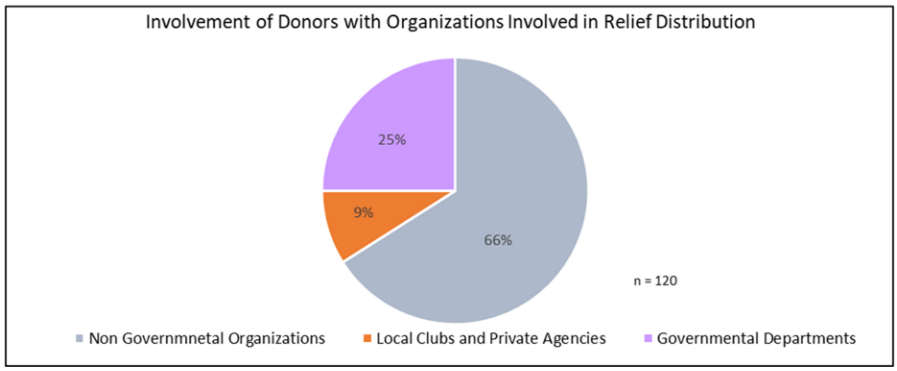


Figure 5. a) Involvement of donors with organizations involved in relief distribution b) Respondents' ratings on different organizations. Data Source: Primary Survey, 2023

while educational exposure was limited: 21% of the villagers were illiterate, and 60% were educated up to higher secondary or lower. As the area is remote and rural, the majority of respondents were engaged in primary activities, and only 5% were in the service sector. 94% of the surveyed households had a monthly income of less than Rupees 20,000 (around 237 USD). As reported, during cyclonic disasters, damage to housing infrastructure and the loss of domesticated animals are widespread (almost 85% reported this), and loss of human life has decreased over time due to the timely dissemination of cyclone warnings. Though nearly all respondents had access to telecommunication and most had social media accounts, only 24% used them to share news and updates about cyclonic disasters. This can be explained on two accounts: first, they are not really initiated to use social media as an instrument for information sharing, and second, immediately after a cyclonic event, mobile networks and electricity supplies are severely affected, which can also deter information circulation. Though the respondents received donations from governmental and non-governmental agencies, they did not have a clear understanding of the modern concept of crowdfunding; they treated aid from all avenues as equal. So, naturally, apart from a very few aware villagers (10%), there is almost no involvement by villagers in crowdfunding ventures. Even when they were prodded to be a part of the crowdfunding as fundraisers or initiators, 58% expressed no interest. A handful (29%) wished to help a new initiative, having known people on board. Though many were not very aware of donation avenues but were well conversant with social media, they accepted that online donations through social media platforms are gaining ground over traditional ways, and 56% believed this trend will continue to grow. But a section (36%) pointed out that, with greater social media use, information sharing may be easier, but this has not really translated into increased donations in physical/monetary terms.

Respondents from each of the 14 GPs reported that relief distribution activity has increased since Amphan (2020). In Gosaba block, the local administration, with the help of the state and central governments, has been distributing relief as part of post-disaster management for years. Still, during the pandemic, when cyclone Amphan badly hit the entire Sundarbans region in May 2020, several Kolkata-based NGOs, friends' groups, and student groups reached remote villages with relief materials such as dry foods and mineral water and distributed them to villagers as per their capacity. This type of relief distribution initiative became more popular during cyclone Yaas (2021), when an NGO or a group brought dry foods like rice, soybean, potato, flattened rice, and mineral water. The study sought to identify which organization was most active in relief distribution during the past two cyclones (Amphan-2020 and Yaas-2021). Most of the respondents in the block (66%) said that either they had received relief materials from NGOs or knew that NGO(s) had distributed relief materials to their locality, but due to a lack of proper information, they did not receive them. But overall, they were satisfied with NGO activities in disaster management. This was somewhat contrary to the study by Mahmud and Prowse (2012), which examined the nature and extent of corruption in disaster interventions in coastal areas of Bangladesh and found that food aid and public works schemes in post-disaster interventions were subject to higher levels of corruption.

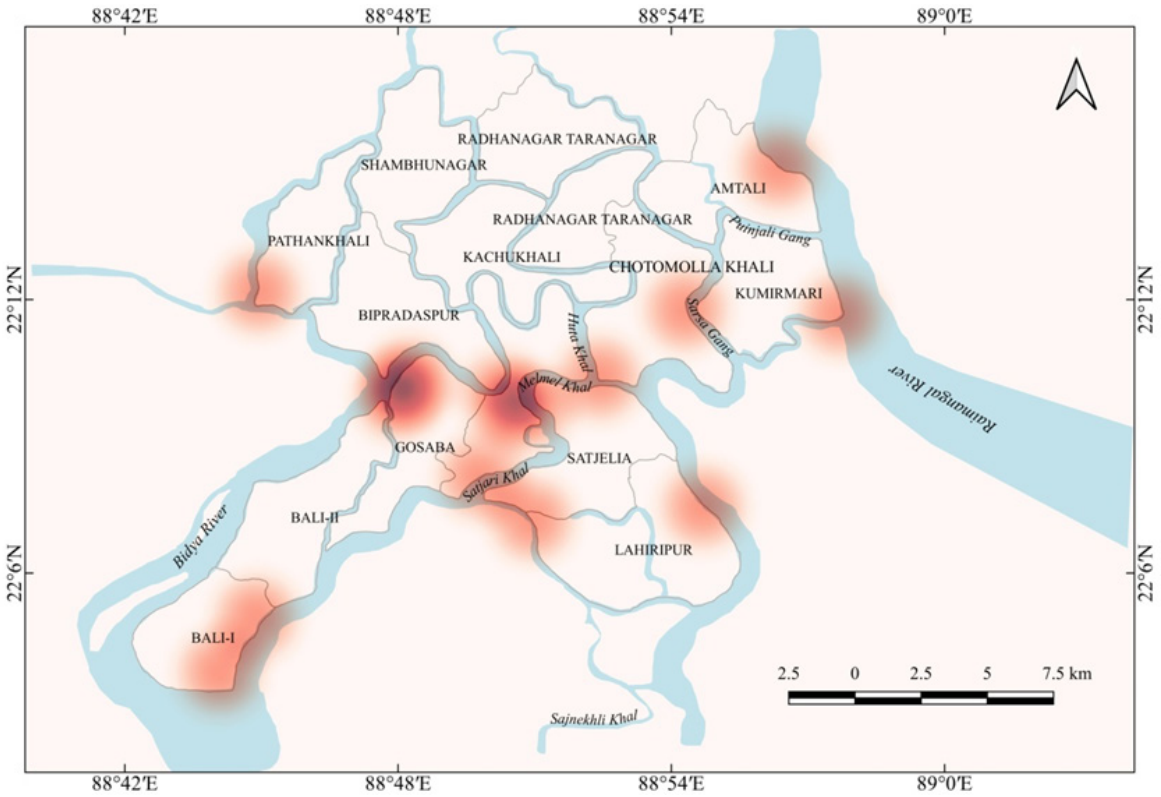


Figure 6. Heat map showing the location of prominent relief distribution points in Gosaba CD Block, Sundarbans. Source: Primary Survey, 2023

The study found a mixed response from respondents regarding government initiatives in relief distribution. Correlations have been drawn to examine the nature of association between respondents' age, gender, educational qualification, monthly family income, use of social media, use of social media to follow or share the news/updates immediately after any such disaster in their locality, respondent's conception about crowdfunding, respondent's involvement in any such crowdfunding platform, respondent's planning to form any group to address the issue of crowdfunding to manage disasters, respondent's opinion about preference of donation platform, change in respondent's habit of donation receipt aftermath a cyclonic disaster due to the usage of social media and respondent's prediction about the future of this current bandwagon of technology-driven relief donation scenario. The study shows that people with a monthly income below Rupees 10,000 (around 118 USD) or who are generally older than 50 years do not use Android mobile devices due to affordability and accessibility issues, respectively. Those who use social media are mostly drawn to WhatsApp, Facebook, and YouTube; none use Instagram. Most respondents who use social media use it as a medium for posting photos and videos and for getting information about other friends in their contact/friend list. Only a few regularly use social media to stay informed about disaster-related information. The concept of crowdfunding is only familiar to younger generations with higher educational qualifications, who sometimes serve as local representatives of NGOs or crowdfunding groups.

This study did not find anyone with their own crowdfunding group, but young and middle-aged people expressed a wish to establish their own crowdfunding groups to stand beside the people of their own village. But those with limited access to technological facilities have no idea what crowdfunding is, and they are obviously not interested in joining any such initiatives because, to them, poverty is their major challenge to overcome. They are satisfied with receiving basic post-disaster relief materials. (See supplementary data file for details)

Respondents also complained that, though relief distribution since cyclone Amphan (2020) has been increased by Kolkata-based NGOs, friend groups, and private relief distributors, only some known locations within the blocks, like Gosaba and Pakhiralay, have gained popularity due to tourism growth. Still, villages like Hamilton Abad, Sadhupur, etc., which are less known to newcomers, have remained neglected in relief efforts. So, relief distributors have to reach out evenly to each needy person with their help (Fig 6).

This study aims to examine the impact of the recent change in disaster management. From the donors' perspective, social media-based crowdfunding initiatives have given them the chance to donate easily from home with a single click, and burdenless crowdfunding projects put no pressure on donors to donate a fixed amount. The increasing trend among NGOs to reach remote areas with relief materials has given them a sense of satisfaction in helping disaster-stricken, needy people with food and water. It also puts pressure on the government, because if it genuinely tries to help every person promptly, it becomes too much, and so help does not reach each person. But if NGOs and individual initiatives extend a hand to disaster victims, they can at least get some food and water during the crisis period. The trending crowdfunding and relief distribution have helped a lot, but some have adverse reactions, too. A villager in Shambhunagar revealed that he became ill after eating the cooked meal of a crowdfunding group. Most respondents said that this growing trend of relief distribution creates increased plastic pollution because food packets and water bottles are not properly disposed of in most cases, harming humans and the ecological health of the coastal block.

Sometimes, the genuine issue of disaster management, like building cyclone shelters, concrete embankment construction, and proper forecasting, is ignored by only giving some relief material, just by giving 2/3 days' relief material. But it is not a temporary problem for coastal blocks like Gosaba. With the increasing problem of climate change, cyclonic storms and other climatic events will become more frequent in this region, requiring permanent solutions such as effective disaster management to make vulnerable communities resilient to these phenomena.

5. Conclusion

The study reveals that this paradigm shift in media usage, from one-way communication to two-way message dissemination, is vital for disaster managers. The acceptability of crowdfunding initiatives has improved over time due to easy access to them through social media accounts for both parties, i.e., contributors and beneficiaries. The majority of donor respondents were eager to participate in crowdfunding for disaster relief, as they genuinely felt the need to stand by the disaster-stricken. The younger and educated ones from a financially well-off background were more inclined to online platforms, as they were well-versed in technology and active on social media too. As this section of respondents regularly shares their life stories, they tend to post donation updates to win social brownie points from their peers. Most donors preferred online donation platforms for crowdfunding endeavours, mostly floated through NGOs, to finance disaster management activities, as there is still a trust issue with banking on unknown locals. If the villagers from the interiors of Sundarbans are made part of the crowdfunding project along with the agency (NGO or local club), then the donors will be more aware of the monetary utilization, and the recipients/ beneficiaries will be able to directly convey for which sectors monetary assistance will help more to overcome the cyclonic disaster wrath. But as most of the crowdfunding agencies for cyclonic disaster management emphasize post-disaster measures only, i.e., supply of relief materials, the holistic planning gets a miss, fund collection for disaster preparedness is also equally needed.

Acknowledgement

It is a part of the submitted research project entitled "Social Media, Crowdfunding and Disaster Tourism: Social and Environmental Impact for Indian Sundarbans" (Letter No. ICSSR-ECR/2021-22/41 dated 12/11/2021) sponsored by the Indian Council of Social Science Research, Eastern Regional Centre (ICSSR-ERC).

References

Adhikary, B. K., Kutsuna, K., & Hoda, T. (2018). *Crowdfunding: lessons from Japan's approach*. Singapore: Springer.

Behl, A., & Dutta, P. (2020). Engaging donors on crowdfunding platform in Disaster Relief Operations (DRO) using gamification: A Civic Voluntary Model (CVM) approach. *International Journal of Information Management*, *54*, 102140.

elleflamme, P., Lambert, T., & Schwienbacher, A. (2014). Crowdfunding: Tapping the right crowd. *Journal of Business Venturing, 29(5)*, 585-609.

Borst, I., Moser, C., & Ferguson, J. (2018). From friendfunding to crowdfunding: Relevance of relationships, social media, and platform activities to crowdfunding performance. *New media & society, 20(4)*, 1396-1414.

Carvajal, M., García-Avilés, J. A., & González, J. L. (2012). Crowdfunding and non-profit media: The emergence of new models for public interest journalism. *Journalism Practice, 6(5-6),* 638-647.

Census of India. (2011). *District Census Handbook, North and South Twenty Four Parganas, West Bengal*. Series-20 Part XII-A & B, Directorate of Census Operations, West Bengal. New Delhi: Registrar General of India, Ministry of Home Affairs, Government of India.

Cohen, E. (2011). Tourism and land grab in the aftermath of the Indian Ocean tsunami. *Scandinavian Journal of Hospitality and Tourism, 11(3)*, 224-236.

Danda, A. A., Sriskanthan, G., Ghosh, A., Bandyopadhyay, J., & Hazra, S. (2011). *Indian Sundarbans delta: A vision*. New Delhi: World Wide Fund for Nature-India, 40.

Fritz, C. E., & Mathewson, J. H. (1957). *Convergence behavior in disasters: A problem in social control* (No. 9). Washington: National Academy of Sciences-National Research Council.

Ghosh, S., & Mistri, B. (2020). Geo-historical appraisal of embankment breaching and its management on active tidal land of Sundarban: a case study in Gosaba Island, South 24 Parganas, West Bengal. *Space and Culture, India, 7(4)*, 166-180.

Gould, K. A., & Lewis, T. L. (2018). Green Gentrification and Disaster Capitalism in Barbuda: Barbuda has long exemplified an alternative to mainstream tourist development in the Caribbean. After Irma and Maria, that could change. *NACLA Report on the Americas, 50(2),* 148-153.

Pachauri, R. K., Allen, M. R., Barros, V. R., Broome, J., Cramer, W., Christ, R. & van Ypserle, J. P. (2014). *Climate change 2014: synthesis report. Contribution of Working Groups I, II and III to the fifth assessment report of the Intergovernmental Panel on Climate Change* (p. 151). Geneva: IPCC, Geneva, 151

Klein, N. (2018). *The battle for paradise: Puerto Rico takes on the disaster capitalists*. Chicago: Haymarket Books.

Korstanje, M. (2014). Dark tourism and place identity: managing and interpreting dark places (contemporary geographies of leisures, tourism and mobility). *Journal of Tourism and Cultural Change, 12(4),* 369–371.

Kraus, S., Richter, C., Brem, A., Cheng, C. F., & Chang, M. L. (2016). Strategies for reward-based crowdfunding campaigns. *Journal of Innovation & Knowledge, 1(1)*, 13-23.

Mahmud, T., & Prowse, M. (2012). Corruption in cyclone preparedness and relief efforts in coastal Bangladesh: Lessons for climate adaptation?. *Global Environmental Change, 22(4),* 933-943.

Marakkath, N., &Attuel-Mendes, L. (2015). Can microfinance crowdfunding reduce financial exclusion? Regulatory issues. *International Journal of Bank Marketing, 33*, 624-636.

McKinsey & Company. (2019). *Digital India: Technology to transform a connected nation*, McKinsey Global Institute. Retrieved from https://www.mckinsey.com/~/media/McKinsey/Business%20Functions /McKinsey%20Digital/Our%20Insights/Digital%20India%20Technology%20to%20transform%20a%20connected%20nation/MGI-Digital-India-Report-April-2019.pdf. Accessed 16 July 2021

Mejia, J., Urrea, G., & Pedraza-Martinez, A. J. (2019). Operational transparency on crowdfunding platforms: Effect on donations for emergency response. *Production and Operations Management, 28(7),* 1773-1791.

Mollick, E. (2014). The dynamics of crowdfunding: An exploratory study. *Journal of business venturing, 29(1),* 1-16.

Moritz, A., & Block, J. H. (2016). Crowdfunding: A literature review and research directions. In Dennis Brüntje & Oliver Gajda (Eds.) *Crowdfunding in Europe*, 25-53, Cham: Springer.

National Institute of Disaster Management. (2007). *National Disaster Management Guidelines. Management of Tropical Cyclones.*

Retrieved from https://nidm.gov.in/PDF/pubs/NDMA/4.pdf. Accessed 20 July 2022.

Nordin, N., & Sum, R. M. (2020). Crowdfunding: the two sided financing alternative. *Journal of Technology Management and Business, 7(1)*, 1-9.

Podoshen, J. S. (2013). Dark tourism motivations: Simulation, emotional contagion and topographic comparison. *Tourism Management, 35*, 263-271.

Rajasingham-Senanayake, D. (2005). Sri Lanka and the violence of reconstruction. *Development, 48(3)*, 111-120.

Rachmawati, R. & Budiarti, C.V. (2016). Use of Space and the Need for Planning in the Disaster-Prone Area of Code River, Yogyakarta, Indonesia. *Indonesian Journal of Geography, 48(2),* 178-190.

Rojek, C., & Urry, J. (Eds.). (1997). *Touring cultures: Transformations of travel and theory*. Sussex: Psychology Press.

Rucińska, D., & Lechowicz, M. (2014). Natural hazard and disaster tourism. *Miscellanea Geographica, 18(1),* 17-25.

Sharpley, R., & Wright, D. (2018). Disasters and disaster tourism: The role of the media. *The Palgrave Handbook of Dark Tourism Studies*, 335-354.

Stone, P. R. (2013). 6 Dark tourism, heterotopias and post-apocalyptic places: The case of Chernobyl. In Leanne White, Elspeth Frew (Eds.) *Dark tourism and place identity*, 79-93. London: Routledge.

Timms, B. F. (2011). The (mis) use of disaster as opportunity: Coerced relocation from Celaque National Park, Honduras. *Antipode, 43(4),* 1357-1379.

United Nations Office for Disaster Risk Reduction. (2008). *Terminology: Basic terms of Disaster Risk Reduction*. Geneva. Retrieved from www.unisdr.org/eng/library/lib-terminology-eng%20home.htm.Accessed on 23 December, 2022.

United Nations. (2007). Terminology. *The United Nations Office for Disaster Risk Reduction*. Retrieved from http://www.unisdr.org/we/inform/terminology. Accessed on 23 December, 2022.

World Bank. (2013). *Crowdfunding's Potential for the Developing World*. Retrieved from https://openknowledge.worldbank.org/handle/10986/17626 Accessed 23 July 2022.

Wright, D., & Sharpley, R. (2018). Local community perceptions of disaster tourism: the case of L'Aquila, Italy. *Current Issues in Tourism, 21(14)*, 1569-1585.

Yusuf, M. (2020). How far can tourism go? Residents' attitudes towards tourism development in Yogyakarta City, Indonesia. *Indonesian Journal of Geography, 52(2),* 208-218.

Zhou, H., & Ye, S. (2019). Legitimacy, worthiness, and social network: An empirical study of the key factors influencing crowdfunding outcomes for nonprofit projects. *VOLUNTAS: International Journal of Voluntary and Nonprofit Organizations, 30*, 849-864.