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Perceptional Community and Institutional Impact of Flood – A Study on Kerala Floods

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Abstract
The earth's climate has changed drastically over time. Climate change was caused by natural and manmade factors. Kerala is an Indian tourist hotspot. August 2018 was one of the state's worst monsoons. More than a million people have been displaced by Kerala's relentless monsoon rains. This study evaluates the communal and institutional impact of the Kerala flood. This study focuses on community vulnerability and resilience. Floods threaten most homes. It's crucial to examine their perceived vulnerability for present and future planning. Data was collected through key informant interviews, field surveys, and household questionnaires. The study proposes incorporating community coping methods and preferences into public awareness campaigns, early warning systems, and disaster management measures. Whatever it is, we must understand why. Climate change and natural disasters will affect water, air, agriculture, infrastructure, health, education, bio-diversity, forests, and socioeconomic sectors. Natural disasters can't be stopped, but we can lessen their impact. It's crucial to learn from such situations to reduce their impact.

Keywords: *Climate change; Disaster; India; Kerala; Monsoon; Rainfall; Flood*

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I. Introduction

A disaster produces massive human, material, or environmental losses that surpass a society's ability to deal with its own resources (WDR, 2018). Disaster definitions include impacts. WHO defines disasters as "any occurrence that causes damage, ecological disruption, loss of human life, deterioration of health and health services on a scale sufficient to demand an extraordinary response from outside the affected community or area." A disaster is an unplanned event that causes considerable damage, destruction, and human suffering, overwhelming local capability and requiring national or international aid, according to the Centre for Research on the Epidemiology of Disasters.

Floods are natural disasters. Floods are complicated phenomena that are interpreted differently by different people, according to Srimant (2013). In India, a river is flooded when its water level reaches the Danger Level (DL). Occurrence of floods a natural phenomena and man needs to live with it straight from the beginning. It's not only a global monsoon hazard. Floods have ravaged areas of India from time immemorial but their influence was not noticed earlier, since the floodwaters would spread over large open countryside which was sparsely settled.

Floods can occur in different ways, usually in value bottoms and coastal areas and be created by a multitude of contributing variables. Their locations and magnitudes vary substantially and as a result they have markedly varied effects upon the ecosystem. Floods result from a variety of basic courses. Floods are caused by heavy, sustained rain. In cold winter places where snowfall accumulates, spring and early summer floods is common when melt rates are strong. In many snow-covered places, rain falling over decaying, melting snowpack causes flooding.

In many estuarine circumstances, the immediate cause is the pounding back of stream flow by the rising tide, particularly during spring tide conditions, or by various tidal surge impacts. Similarly along low lying shores flooding may result from excessively high tides associated with storm surge effects caused by a combination of very low barometric pressure and high wind speeds. Other causes of flooding include earthquake-caused tsunamis, landslides into enclosed or semi-enclosed water bodies, and dam and water control facility failures.

Keralafloods - Overview

Kerala has 600 kilometres of Arabian Sea coastline on India's tropical Malabar Coast. It has palm-lined beaches and canal backwaters. Kerala's 44 rivers all flow west. 41 flow west, 3 flow east. Kerala's rivers are

short, narrow, and low-flowing. The rough terrain and short distance between the western bowels and the sea make the river flow quicker. All the rivers are monsoon-fed, and many of them dry up in summer.

Kerala is prone to frequent natural and man-made disasters that inflict loss of life, livelihoods, infrastructure, and property, as well as disruption of economic activity. Rapid urbanisation, environmental degradation, a growing population, and climate change have increased the state's disaster risks, necessitating a shift from a relief-centric to a proactive and comprehensive approach to disaster management, covering prevention, mitigation, preparedness, response, and recovery. Kerala State Disaster Management Rules, 2007 and Kerala State Disaster Management Policy, 2010 were defining moves towards holistic disaster management in the state. The Disaster Management Act, 2005 requires each state to have a State Disaster Management Plan and to finance its actions. While the process of hazard, vulnerability, and risk analysis on which DM plans should be based has begun, it is felt that plans should not be prepared based on the risk analysis's outcome.

In Kerala, riverine flooding occurs when severe or continuous rainfall exceeds soil absorption and stream and river flow capacity. This causes a water course to overflow its banks onto flood plains, which are relatively flat land adjacent to a natural water course, composed primarily of unconsolidated sediments transported by the related stream and subjected to periodic flooding. Reclamation and settlement in floodplain area is a major cause of flood damage in Kerala. Defining a region's flood potential is tricky.

To estimate flood hazard, one must know where floodplains are, how often and how long they are covered by water, and when flooding can be predicted directly from rivers and streams. This is a time-consuming effort that helps determine the statistical frequency of flood episodes. Without frequent stream gauging data for all Kerala's rivers, direct measurements are impossible.

II. Research Objective

The overall aim of the research was

1. to understand the perceptional assessment on, Community and Institutional Impact of Flood of people in flood prone areas
2. to investigate the power dynamics at community and institutional level and to explore the complexities associated with local adaptation programmes in the flood prone areas.

III. Research Design

The research is descriptive in nature. The study intends to identify the factors leading to the comprehensive perceptional assessment in different perspectives of the Socio Economic scenario due to floods. Both primary and secondary data are used in the study. Primary data is required to analyse the assessment in different perspectives of the Socio Economic scenario due to floods Opinions from the households of the selected Taluks from the selected districts of Kerala. The secondary data is used to collect the data of the households as well as the policy advocacy prevailing in the current scenario. The secondary data is collected from the reports of the District Administration of the Kerala Government.

SAMPLING DESIGN AND TECHNIQUE

The target population, for the study that is, household people from the state of Kerala from the Districts of Wayand, Idukki, Alappuzha, Kottayam, Kozhikode, Malappuram and Pathanamthita. Purposive sampling isentirely based on the judgment of the researcher, in that a sample is composed of elements thatcontainthemostcharacteristics,representativeortypicalattributesofthe population. Duetotimeandfinancial resourcelimitations,428households were randomly sampled and interviewed at community level. The sample size was determined using the RaoSofthttp://www.raosoft.com/samplesize.html with 95% confidence level.

INSTRUMENT AND CONSTRUCTS

The primary data is collected through well-structured questionnaires. Seven districts are chosen for this purpose on the priority of the most flood prone areas in Kerala in last one decade. The questionnaire also elicits information on the demographic profile of the households. To develop the questionnaires, the existing literature was reviewed. The questionnaires are also vetted by a panel of subject experts, statisticians, Government Officials and senior level officers of the District Administration and Disaster Management Team. The questions in the questionnaires are sequentially arranged and the questions are asked in a simple and understandable manner. The respondents are first educated about the purpose of the study and assurance of confidentiality of the data is given to them.

RELIABILITY TEST

Subsequent to the pilot study, the researcher verified the reliability of the data by using the Cronbach's alpha test (Cronbach, 1951)..

Table 1 displays the results of the reliability tests performed on the questionnaire.

Table 1: Cronbach's Alpha for research instrument

Constructs	Cronbach's Alpha (first 70 respondents)
Social Impacts on Community and Institutions	0.825
Poverty	0.838
Civil Society Role	0.793

From the above tables, it can be inferred that the Cronbach's alpha values in respect of all the constructs has exceeded the threshold limit of 0.6 indicating that the variables used to measure the constructs are reliable. Hence, all the variables included in the constructs possess the desirable internal consistency needed for further analysis.The questionnaire was distributed to all the selected households from each district. The researcher has made frequent visits to the district and taluk to collect the questionnaires. The final number of questionnaires collected from the respondents are shown in Table 3.3.

Table 2: No. of questionnaires accepted for the study

No. of questionnaires distributed	No. of questionnaires received	No of questionnaires rejected	No. of Questionnaires taken for the Study
525	492	64	428

With the expectation of certain amount of rejection in the responses, the researcher distributed a total of 525 questionnaires which was in excess of the required sample size. After scrutinizing the responses received, the researcher dropped about 64 responses on the whole and the final sample was 428.

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IMPACT OF FLOODS

Floods have social, economic, and environmental effects on individuals and communities. The detrimental and positive effects of flooding depend on the location, extent, and sensitivity of the natural and built areas they affect.Positive and negative flood effects depend on location, duration, depth, speed, and the susceptibility and value of affected natural and built habitats. Floods have social, economic, and environmental impacts on individuals and communities.

Floods affect communities and individuals socially. Flooding causes loss of life, property damage, agricultural destruction, livestock loss, and waterborne infections. Damaged communication linkages and infrastructure such as power plants, highways, and bridges can halt economic activity, compel people to leave their homes, and disrupt regular life.

Similarly, industry disruptions can cost jobs. Damaged infrastructure can impair clean water, wastewater treatment, energy, transit, communication, education, and health care. Floodplains can be economically susceptible due to lost livelihoods, purchasing power, and land value. Floods can traumatise victims and their families. Losing loved ones affects children deeply. Homelessness, property loss, and commercial and social disruptions induce stress. Some people experience long-term psychological effects.

Flooding in agriculturally important locations can harm crops, fences, and cattle. Flooded roads and destroyed infrastructure exacerbate crop losses from rain, waterlogged soils, and harvest delays. Reduced agricultural production can have far-reaching impacts if food prices rise due to supply shortages. Flood events can have long-term benefits for agricultural productivity by recharging water resource storages and regenerating soil fertility via silt deposition.

Damage to public infrastructure impacts many more people than flooded houses and businesses. Flood damage to highways, rail networks, and trade ports can hurt regional and national economies. Flooding often causes short-term tourism downturns. While the damage on tourism infrastructure and time needed to return to full capacity may be small, photos of flood-affected areas typically lead to booking cancellations and a considerable drop in tourist numbers. Urban flooding damages houses and businesses. Structure and content damage cause losses. Flood insurance protects a building and its contents from damage.

COMMUNITY AND INSTITUTIONAL IMPACT ON FLOODS OF THE RESPONDENTS

Floods bring benefits to human-being. Severe floods however, if not being well managed, might cause tremendous damages to people's lives through destructive impacts on infrastructure and ecological environment as well as disturbance to livelihood activities of inhabitants living in flood-prone areas. As full flood protection is neither sustainable nor possible it is crucial to reduce the impact of floods on people and economies in both poor and rich countries through the development of appropriate strategies to reduce flood exposure and vulnerability. Institutions and communities are no longer seen as recipients; rather, they have become critical stakeholders who have a major role to play in the management of community flood management programmes. Community involvement is more effective when people are fully conscious, empowered and trained. It is

important, therefore, that people be provided with an opportunity to play a more active role and that the government or public officials facilitate and provide catalytic support for community-based flood-management programmes.

The impact of floods on a community is based, among other things, on the historical experience and traditional backgrounds and features of communities. Communities are usually composed of many societal actors more or less firmly bonded to each other and which pursue interests more or less differentiated. We can find cohesive communities, but also cohesive groups inside non-cohesive communities (even with levels of conflict more or less high inside). In the absence of organized community participation (even at the level of specific groups), most of the activities are carried out at individual or household level, driven by individual necessity.

Community activities to enhance participation are based on five factors: — The community's features; — The community's needs; — Effectiveness and efficiency of activities; — Practicability of implementation; — Building local social capital.

Recognizing and improving organization or organizing directly effective community participation for flood management can occur in many ways. It is intended to address local leaders and disaster managers on how to organize/valorize people's participation/community activities and strengthen flood management at the local level. Several issues are also covered in order to facilitate the creation of the institutional frameworks necessary to enhance community participation (and/or to valorize existing networks). These are mostly related to the engagement of flood managers, non-governmental organizations (NGOs) and civil society in its broader sense, entrepreneurs, and policymakers in harmonizing community activities with other development and natural disaster policies.

Table 3 Community and Institutional Social Impact of the Respondents in Flood area

Death of people in the community	19	4.4
Adequacy of the physical infrastructure in the community (water supply, sewers, services and commodities)	27	6.3
Adequacy of the community's social infrastructure, of health, well-being, education, libraries, etc.)	382	89.3
Adequacy of housing in the community	395	92.3
Workload for institutions, local authorities, regulatory bodies	17	4
Cultural integrity (maintenance of local culture, tradition, rites)	16	3.7
Resource rights and access	217	50.7
Influence on cultural heritage and other major archaeological, cultural or historical sites	211	49.3
Changes in equity/social justice issues concerning minority or indigenous groups	338	79
Economic prosperity	75	17.5
Dependence/autonomy/diversity/viability of the community	2	0.5
Opportunity cost (loss of other options)	13	3
Real crime	337	78.7
Real violence	91	21.3
Social tensions, conflicts or serious divisions within the community	96	22.4
Corruption, credibility and integrity of the government	8	1.9
Level of community participation in decision-making	29	6.8
Social values of heritage and biodiversity	61	14.3
Other impacts on this level (specify)	21	4.9

Source: Primary Data

PERCEPTIONAL ASSESSMENT– FRIEDMAN TEST

Friedman Test is a non-parametric test used to find out the mean rank of each variable. Based on the mean rank it is identified that the priority is given to factors Community and Institutions by the respondents. The null hypothesis is that there is no significant difference among the ranks provided by the respondents.
Table 4depicts the opinion of the respondents.

Table4 - Perceptional Assessment on Social Impact – Friedman Test

Sno	Community and Institutions	Mean Rank	Chi-Square	Asymp.Sig
1	Death of people in the community	5.04	527.646	0
2	Adequacy of the physical infrastructure in the community (water supply, sewers, services and commodities)	5.86		
3	Adequacy of the community's social infrastructure, of health, well-being, education, libraries, etc.)	2.9		
4	Adequacy of housing in the community	3.58		
5	Workload for institutions, local authorities, regulatory bodies	4.98		
6	Cultural integrity (maintenance of local culture, tradition, rites)	3.54		
7	Resource rights and access	3.22		
8	Influence on cultural heritage and other major archaeological, cultural or historical sites	2.15		
9	Changes in equity/social justice issues concerning minority or indigenous groups	3.65		
10	Economic prosperity	4.12		
11	Dependence/autonomy/diversity/viability of the community	3.22		
12	Opportunity cost (loss of other options)	3.89		
13	Real crime	3.45		
14	Real violence	2.65		
15	Social tensions, conflicts or serious divisions within the community	4.11		
16	Corruption, credibility and integrity of the government	3.56		
17	Level of community participation in decision-making	3.33		
18	Social values of heritage and biodiversity	2.54		
19	Other impacts on this level (specify)	3.89		

Data: Primary Source

Table 4 indicates that P value of 0.00 which is less than the ideal p value of 0.05 and the null hypotheses is rejected at five percent significance level. Hence it is concluded that there is a significant difference between the mean ranks towards

IV. Discussions and Conclusion

In addition to this, flooding can occur for a variety of other reasons, such as the overflow of water from rivers and oceans, the overflow of water in the plain as a result of dams breaking, or the excessive flow of water as a result of abrupt natural disasters. It is common knowledge that flooding, particularly that which is brought on by waterlogging, which is mostly the result of excessive rainfall, can have fatal results. It brings about deaths, an increase in disease, an increase in prices, and a loss of economic activity. Flooding can occur in regions that, among other problems, have an inadequate drainage system, excessive precipitation, and environmental degradation.

Some measures are being considered for adoption in an effort to either prevent or lessen the impact of flooding. It is the responsibility of the state government to take the necessary steps to combine relief efforts with rehabilitation and reconstruction efforts. Provide periodic notice. Allot extra funding for flood. Insist to people that they should not settle close to the dams. Dams are built to prevent flooding, but if one were to fail, the consequences would be catastrophic. The significant rainfall, like that which caused the flood in Kerala, did not make it any simpler for the dam to prevent floods. To prevent flooding and water from overflowing into the sea, the river should have its depth increased.

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