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FINANCIAL RISK ASSESSMENT AND QUICK RECOVERY STRATEGY DURING MAJOR DISASTERS IN PAKISTAN (A STUDY OF QUALITATIVE AND QUANTITATIVE ANALYSIS)

Waqas Ahmed and Dr. Sohaib-Uz-Zaman

ABSTRACT

Pakistan is one of the most shamble inclined nations in South Asia, with harm and misfortune assessed at $ 18 billion over the previous decade (World Bank 2017), however no investigations have been led to decide the harm, cost and recuperation examination of areas influenced by serious debacles (tremor 2005, tropical storm 2007, floods 2010). This review fills this hole by including a presentation that characterizes the debacle by giving an outline of each serious calamity as well as economic crisis. Its approach focuses on the economic impact of disaster outcomes as well as government and institutional frameworks for the implementation of reconstruction and recovery programs in each affected area, and statistical interventions (correlation, regression) will be used to analyze the relationship between the cost of immediate damage as well as the cost of repairing a partially damaged or completely damaged part of the property as part of a pecuniary danger evaluation. The essential result will decide if a catastrophe the board strategy or recuperation measure has been effective in diminishing danger in the influenced regions.

Keywords: *Flood, Earthquake, Cyclone, Financial Risk Assessment, Quick Recovery.*

INTRODUCTION

Quakes, volcanic ejections, avalanches, floods, dry seasons and different debacles have killed multiple million individuals over the most recent twenty years, causing torment, infection, vagrancy and wretchedness just as it influences one billion individuals and billions of dollars in land. As

indicated by one review, by 2025, 80 percent of the total populace will live in agricultural nations, and up to 60 percent of those will have genuine wounds. The world's prosperity for catastrophes, regardless of whether normal or man-made, is expanding step by step. The impacts of fiascos have for quite some time been viewed as problematic locally improvement measure. The fiascos halted this present city's improvement cycle. As indicated by the 2001 World Disasters Report, 97% of ruinous happen in non-industrial nations and just 2% in created nations. Subsequently, given the idea of worldwide fiasco, its greatness and its danger, center on great calamity executives as displayed in Table 1 beneath:

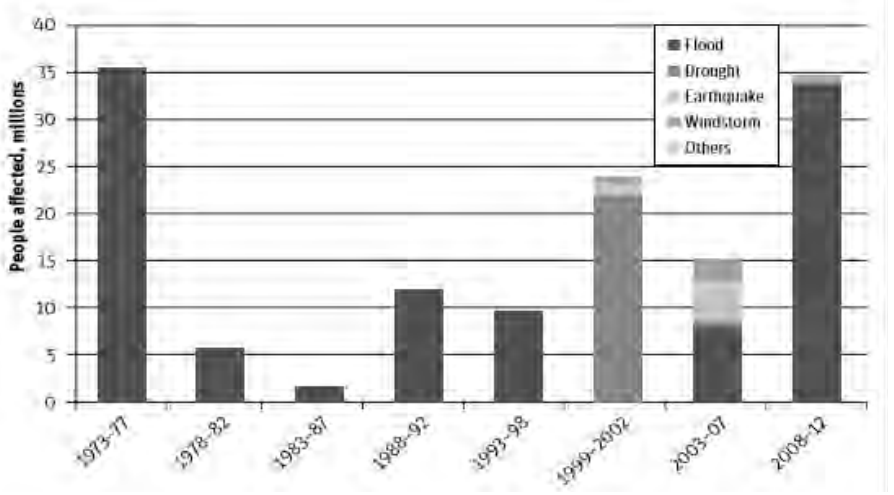
Table 1: Death Toll in South Asia between 2000-2009

Detail	Afghan-istan	Bangla-desh	Bhutan	India	Mal-dives	Nepal	Pakistan	Sri Lanka
Droughts	37	0	0	20	0	0	143	0
Earth Quakes	1214	4	0	37705	102	0	73576	35399
Epidemics	3525	245	0	1217	0	377	163	2
High Temperature	348	1200	0	4806	0	108	527	0
Floods	1106	2388	200	12166	0	948	2163	345
High Scale Rains	33	0	0	609	0	773	239	0
Storms	1648	5391	0	790	0	0	369	14
Forest Fires	0	0	0	0	0	0	0	0

(Jain, 2018)

As far as hazard, Pakistan is one of the most catastrophe inclined nations in South Asia, enduring harm and misfortune assessed at US $ 18 billion over the previous decade (World Bank, 2017). Outrageous degrees of flood risk happened in the Indus River during the storm season in July and September because of occasional changes in the Arabian Sea or Bay of Bengal (NDMI, NDMA, UNDP, 2007). By and large, catastrophic events in Pakistan influence around 3,000,000 individuals every year, which is about 1.6% of the all-out populace. Figure 1 shows the quantity of individuals influenced by debacles since 1973, by sort of danger.

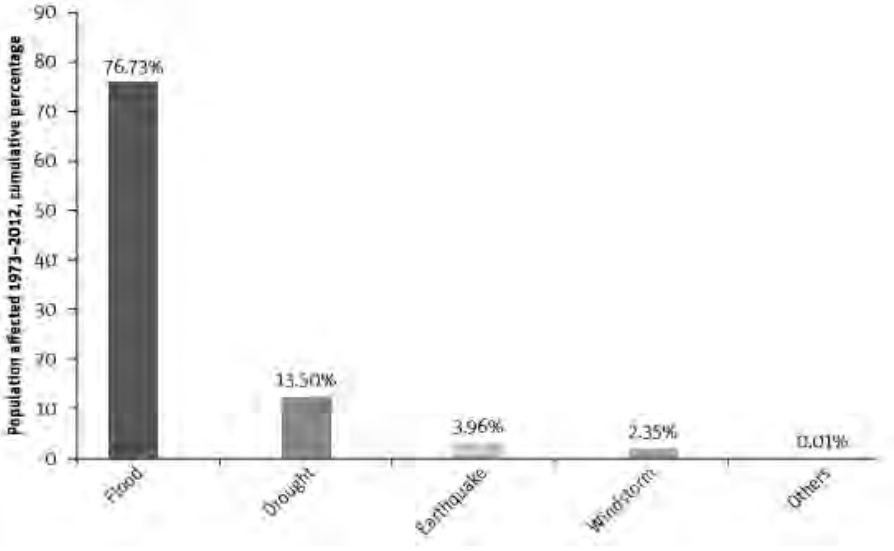
Figure 1: Number of disaster victims in Pakistan, 1973-2012, by type of disaster.



(No, 2015 Fiscal Disaster Risk Assessment Options for Consideration.)

Floods influenced around 77% of all catastrophe casualties in Pakistan somewhere in the range of 1973 and 2012 (Figure 2). Dry spell is the second most wrecking danger, trailed by quakes, typhoons and other ruinous events (like weighty downpours and avalanches).

Figure 2: The impact of the disaster on the population of Pakistan, 1973-2012, by type of disaster.

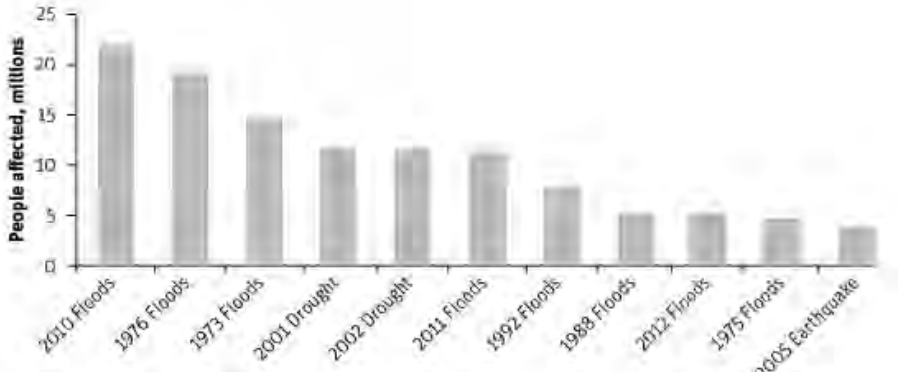


(No, 2015 *Fiscal Disaster Risk Assessment Options for Consideration*.)

Since 1973, 11 catastrophic events have struck Pakistan, influencing multiple

million individuals. Eight out of eleven fiascos accepted to influence multiple million individuals. Furthermore, the three headliners (surges of 2010,1976 and 1973) each influenced in excess of ten million individuals (Fig. 3).

Figure 3: Disasters affected more than 4 million people in Pakistan from 1973 to 2012.



(No, 2015 *Fiscal Disaster Risk Assessment Options for Consideration*.)

To lay it out simply, this report will focus on economic impacts, financial peril examination, and fast recovery preparing for genuine failures in Pakistan (seismic quake 2005, storm 2007 and floods 2010) along with statistical interference relations among the direct cost and reconstruction cost of fairly or completely damaged assets to come to know how the aftermath of these ruinous costs are immovably associated with each other.

Literature Review

Literatures taken as secondary sources are:

A comprehensive study from the Asia Journal of Environment and Disaster Management (AJEDM 2009) has done and focused on the reduction of hazards in the Asian region. If it focuses on the environment as well as disaster-related issues in the Asian region. This newsletter provides an opportunity to present research findings not only through academic research, but also through the application of field research. (Sanderson & Burnell, 2017; Tunio, 2020).

Description by "Paulina Aldunce": Opportunity to improve disaster management in Chile - a study was born. This research paper seeks appropriate mechanisms to improve the management of rain-related disasters in Chile. This document covers the social aspects (e.g. community participation, social

disadvantages, etc.) as well as disaster management.(Aldunce & León, 2007l Katper, et al., 2020).

"The Conference on 'Disaster Resilience 2009 - International Conference on Resistance through Local Government' held in Kathmandu, Nepal from 11-12 November 2009 - focuses on mechanisms for the protection of human and animal life and property against disasters. It also discusses the use of new technologies, information technologies as well as social components (Andrew Collins, 2009).

The book Gujar R. K. and Jatt BC - "National Disaster" Jaipur (Raj.) - describes the nature and extent of disasters in the state of Rajasthan. This book contains ground planning, reports, disaster risk management, preparation for mitigating the effects of disasters. (Gurjar R. K. and Jatt, B.C. 2001).

The book Dekens, Julie published and edited, "Regional knowledge for disaster preparedness" (2007) is based on a review of the literature on local knowledge and practice as well as an attempt to provide an overview and context of local knowledge and disaster preparedness, its own understanding in disaster management, as well as benefits and related issues. (Dekens, 2007).

Research gap

Pakistan suffered major disasters such as the 2005 earthquake, the 2007 torrential downpour, the 2010 floods, but no research has been conducted to assess financial risks, damage, economic impact (such as GDP cuts, job losses leading to increased poverty etc.). Based on the above literature this study focused on the analysis of damage to key sectors during earthquakes, floods and storms, the economic impact, and the financial risk assessment mainly as costs which are: direct damage, indirect loss and the cost of repairs, as well as strategies provided for the rapid recovery of the sectors as well as suggestions for improving national disaster management and lowering the mitigation impact of disasters.

RESEARCH METHODOLOGY

The study centers around both qualitative and quantitative (secondary data) information to layout the adverse consequence of fiascos on economic elements, as well as evaluating the damage and surveying the requirements of the most influenced areas like housing, education, agribusiness. It will likewise survey the financial cost appraisal (direct damage, indirect loss, and remaking cost) of the influenced areas during serious fiascos, as well as

statistical interference (correlation, regression) for assessing the interlinkage among direct and rebuilding cost of harmed financial resources, also strategies that have been executed to facilitate the recuperation of influenced areas. In view of the data gave above, following hypothesis has been defined:

- ✓ H1: Post disaster consequences significantly lead to negative impact on economic factors
- ✓ H2: Post disaster consequences significantly lead to greater financial risk assessment (financial costs) in affected sectors.
- ✓ H3: Proper reconstruction strategy could significantly lead to quick recovery of affected sectors.
- ✓ H4: Replacement cost (reconstruction cost) will have significant relationship with direct damage cost of monetary assets in 2005 earthquake.
- ✓ H5: Replacement cost (reconstruction cost) will have significant relationship with direct damage cost of monetary assets in 2007 cyclone
- ✓ H6: Replacement cost (reconstruction cost) will have significant relationship with direct damage cost of monetary assets in 2010 flood.

Data collection

The information from the report "Primer Damage and Needs Assessment" will be essentially utilized for exploring the effect of the tremor, flood, and tornado, just as assessing the recuperation of influenced areas. Asian Development Bank and World Bank arranged this report. The appraisal was co-ordinate by the ADB and WB DNA center groups with the Economic Affairs Division, Planning Commission, and National Disaster Management Authority at the government level, just as the commonplace/state/FATA Planning and Development Departments and Disaster Management Authorities (or counterparts).

DATA ANALYSIS AND INTERPRETATION OF SECONDARY DATA

i) 2005 Earthquake

The quake that struck Pakistan on October 8, 2005, left broad destruction afterward, killing somewhere around 73,000 individuals, seriously harming another 70,000, and dislodging 2.8 million individuals. AJK and the eastern KPK took the brunt of the harm, with broad harm to financial resources and

framework, as well as trade, and transportation.

Economic Impact

The tremor's effect on Pakistan's true GDP development (barring AJK GDP) is relied upon to be little which was 0.4 percent. Because of an extended decrease in KPK yield for FY06, the extra effect of the tremor was probably going to diminish yield development significantly further, to around 6.1 percent. Without balancing income increments or expenditure reductions, the quake is relied upon to build the Government of Pakistan's FY06 deficiency by 0.6 to 1% of GDP.

Keeping up with quick development and decreasing neediness while dispatching the quake recuperation

The public authority had expressed that it would retain a portion of the monetary effect of the quake by cutting low-need spending and raising extra homegrown income. The quake has brought about extra spending prerequisites for help, remaking, and recovery.

Impact on Major Sectors

Misfortunes in the housing area represent 84% of the complete housing stock in the influenced AJK Districts and 36 percent of the housing stock in the five influenced Districts (K.P.K). 61.2 billion (US$1.03 billion) in harms: The tremor annihilated 203,579 housing units in AJK and N.W.F.P (new name K.P.K), while 196,573 were harmed to changing degrees. In AJK, 116,572 individuals were killed and 88,368 were harmed, while in KPK, 87,007 individuals were killed and 108,205 were harmed. The influenced houses were generally provincial, with metropolitan units representing just 10% of the aggregate. A significant part of the provincial housing was based on steep inclines, making access troublesome. Beside harm to instructive establishments (education) and workplaces, the training area had likewise experienced huge human misfortunes, including understudies, instructors, and staff. As indicated by starter gauges, around 18,095 understudies and 853 instructors and instructive staff were killed across the NWFP (new name KPK) and AJK. The water system subsector had experienced the most harm, with water channels, redirection structures, water lifts, spillways, and water tanks experiencing the most harm. 9 billion, which incorporates the

deficiency of enormous and little ruminants and poultry, animal sheds, and harm to augmentation and exploration structures.

Reconstruction Strategy

In housing area support the utilization of peril safe development principles and plans; Reconstruct nearby; Ensure that the revamping is driven by the proprietor; Rebuild utilizing recognizable strategies and promptly accessible materials; Only move settlements when totally important; Ensure that metropolitan redevelopment is restricted and vital; Provide steady, non-compensatory help; Coordination of different recreation drives and value norms; Connection of housing to occupations and framework recovery. In institutional area (education) giving brief and semi-extremely durable elective learning spaces, giving learning materials, preparing instructors to supplant the people who have passed on, and rejuvenating training authoritative constructions. Schools that had been somewhat harmed would likewise be repaired, and continuous educator preparing would be needed in the medium term. In agriculture sector the prompt requirements are for winter crops, principally wheat development, the development of temporary animal sheds to shield creatures from outrageous cold, and the maintenance of water channels. On the off chance that wheat development help was not reached out promptly, the influenced individuals would not be able to develop wheat, which is their primary type of revenue. In longer term, the accentuation ought to be on reestablishing animals' inventories and restoring seriously harmed patios and soil preservation framework.

ii) 2007 Cyclone

Yemyin cyclone with winds of up to 130 km/h, caused heavy rains in Pakistan and India on June 26, 2007. 420 passing, 109 missing individuals, 371,092 individuals without cover, and roughly 72,000 houses obliterated. More than 6,400 towns in 28 regions of Balochistan and Sindh were influenced.

Economic Impact

Floods would contrarily affect the economy, especially the financial shortfalls of the area, provincial, and central governments. The public authority had declared a Rs.15000 grant for each influenced family. It was expected to have minor effect on Pakistan's GDP, in the scope of 0.3 percent. The general effect of the fiasco on GDP development was probably going to

be minor. Pakistan had encountered essentially high swelling rates, with food cost increments dominating non-food expansion. The nation presently had a current record shortage of 5.5 percent of GDP because of the sharp decrease in trade execution.

Impact on Major Sectors

As indicated by information from the provincial and regional governments at the time of the appraisal, 71,596 housing units were annihilated in the influenced spaces of Balochistan and Sindh, incorporating 41,718 and 29,878 in Balochistan and Sindh, addressing 6% of the absolute housing stock in the influenced areas of Balochistan and Sindh, separately. These include incorporate remittances for insignificantly harmed houses and a potential increment of up to 15% in the quantity of completely annihilated houses because of current detachment, in addition to other things. Considering a common structure plan and unit material and work costs, the complete worth (substitution cost, not deteriorated) of the housing lost in the influenced regions was US$76.4 million. Roughly 85% of the houses influenced by the twister and flooding were in rustic regions, as indicated by the 1998 evaluation. Additionally, flood and twister seriously hurt the agribusiness sector in both Balochistan and Sindh. Direct misfortunes of collected and standing yields (crops), perish animals, partially damaged or totally obliterated water system foundation, and different resources were assessed to be Rs13.2 billion. With Rs6.0 billion in misfortunes, the yield sub-area experienced the most, trailed by water system (34.3 percent) and animals (19.2 percent). In instruction (education) area it was assessed that 1,359 public area schools had been influenced to fluctuating degrees by the floods; these are principally rustic schools. 33% of the harmed structures should be revamped, while the rest to be repaired.

Reconstruction Strategy

In agribusiness the World Bank had distinguished an aggregate of US$67.81 million as the quick and momentary necessities to help Sindh's ranchers adapt with the impacts of floods. The most squeezing need for instruction was the restoration of classes in every single instructive foundation. In housing area the assessed cost of recreation ranges from US$103 million to US$244 million, contingent upon the approach taken by the public authority. Recreation should ideally be built on acceptable structural standards, had appropriate hazard-resistant elements, and be in less flood-prone areas. A second alternative entails flood and cyclone-resistant house renovation (but

not seismic resistance), while a third option assumes no developments in construction technologies and materials.

iii) 2010 Flood

The floods in Pakistan had been the most exceedingly terrible since 1929 and had influenced more than 20 million individuals. Whole towns had been washed away, urban areas have been overflowed and homes had been annihilated. Huge number of sections of land of yields and farming grounds had been harmed, with huge soil disintegration happening.

Economic Impact

The floods were expected to have significant economic effect on Pakistan. The absolute harms and misfortunes to farming were projected to be roughly PKR 429 billion. Harvest horticulture's worth added was currently expected to fall by roughly 10%. The effect on inflation was now seen, with month-to-month expansion arriving at its most significant level in very nearly two years.

Impact on Major Sectors

More than 1.6 million dwelling units in the country were completely or partially destroyed as a result of the floods. An estimated 913,307 homes had been destroyed, with an additional 694,878 slightly damaged. Sindh's housing stock had been the worst affected among provinces, with nearly 880,000 dwelling units fully or partially damaged. The DNA team gathered unit material and labor prices from the field to estimate the cost of a typical ruin houses. The country's record floods had destroyed a total of 10,407 educational institutions, with 3,741 destroyed and 6,666 partially damaged. However, afflicted institutions account for only 6.2 percent of all institutions. The quick and unforeseen surge of water diverted individuals, structures, harvests, animals, food, and seed stocks in the rockier regions. Harvests were crushed on the fields, but since the water was streaming gradually, most occupants had the option to evacuate themselves, their merchandise, and creatures to higher ground. The general misfortune in yields, creatures, and fisheries is projected to be around US$ 5.0 billion. Yield misfortunes were the most noteworthy (89% of in general harm), with direct annihilation to 2.1 million hectares of standing Kharif crops. Aberrant mischief might happen if future harvests were not planted inferable from issues with land readiness and sources of info.

Reconstruction Strategy

The costs of home reconstruction and repair had been calculated and

ranges between US$1.483 and 2.206 billion. The team also calculated the costs of activities intended to reinforce important policy and regulatory frameworks. The anticipated recovery costs were PKR 42,906.58 million (US$ 504.8 million), including US$ 63.7 million for short-term repair and restoration work. Efforts should be done in the short term to ensure that the educational process continues in the affected areas. The expenses of reestablishing ordinariness in the agriculture, animals, and on-ranch water management, and fisheries sub-areas had been evaluated carefully. The group had additionally assessed the expenses of activities pointed towards the fortifying significant strategy and administrative structures.

RESULTS OF STATISTICAL INTERFERENCE AND INTERPRETATION

These disasters and their aftermath have inflicted a major financial strain on Pakistan. The cost of reconstruction, also known as the replacement cost, is directly tied to the direct damage cost of monetary assets, and statistical analyses have been performed to evaluate whether or not there is a substantial association or not. The accompanying tests are directed utilizing the SPSS 20 Version software:

i) 2005 Earthquake

Table 2: Fundamental Estimate of Total Losses and Reconstruction Costs as of November 10, 2005

Sr. #	Sector	Direct Damage (Rs. Mill.)	Indirect Losses (Rs. Mill.)	Reconstruc-tion Costs* (Rs. Mill.)	Reconstruc-tion Costs* (US$ mill.)	Shares of Total Reconst. Costs (%)
1.	**Social Infrastructure**					
	Private Housing**	61,220	7,218	92,160	1552	44
	Health	7,114	1,378	18,012	303	9
	Education	19,920	4,133	28,057	472	13
	Environment	12		8,985	151	4
	Public Administration	2,971	687	4,254	72	2
2.	**Physical Infrastructure**					
	Transport***	20,165	4,061	24,699	416	12
	Water Supply and Sanitation	1,165		1,900	32	1
	Irrigation	324		623	10	0
	Energy, Power and fuel	744	1,561	2,377	40	1

3. Economic Sectors****					
Agriculture and livestock	12,933	6,770	17,846	300	9
Industry and Services	8,578	8,379	9,178	155	4
4. Total=1+2+3(in Rs. Million)	135,146	34,187	208,091	3,503	100
o/w: Azad Jammu and Kashmir	76,375	17,671	116.625	1,963	56
: North West Frontier Province	58,771	16,516	91,467	1,540	44
o/w: Public Assets	48,131	12,175	82,187	1,384	39
: Private Assets	87,015	22,012	125,904	2,120	61
o/w: Urban Areas	26,490	13,675	46,163	777	22
: Rural Areas	108,656	20,512	161,928	2,726	78

(Asian Development Bank & World Bank, 2005)

Correlation

Correlations

		REPLACEMENT COST	DIRECT DAMAGE
REPLACEMENT COST	Pearson Correlation	1	.774**
	Sig. (1-tailed)		.000
	N	17	17
DIRECT DAMAGE COST	Pearson Correlation	.774**	1
	Sig. (1-tailed)	.000	
	N	17	17

***. Correlation is significant at the 0.01 level (1-tailed).*

According to table 2, which shows the direct damage and reconstruction costs of monetary assets in the 2005 earthquake, the overall direct damage cost is PKR 135146 million, and the reconstruction cost of affected sectors, which is heavily reliant on the direct damage cost, is estimated to be PKR 208091 million. To establish the link between the variables, a statistical Pearson correlation analysis was performed. Table 3 shows that direct damage cost has a strong and positive significant connection with dependent variable replacement cost, with $r=0.774$ at $p<0.01$ significance level.

b) Regression Analysis:

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.774[a]	.599	.572	32616.46440

a. Predictors: (Constant), DIRECT DAMAGE

The value of R is 0.774 in the table above, which represents the correlation value between the dependent and independent variables. The existence variation of independent factors on the dependent variable is exemplified by R square = 0.599 in the preceding model description. It calculates how much of the variance in the dependent variable is explained by the model's independent variables. The R2 result indicates that the dependent variable, rebuilding cost, is explained by the direct damage cost of monetary assets in the modal, indicating a good modal fit. Similarly, the adjusted R square of 0.572 denotes the proportion of variance described by just those independent variables (direct damage cost) that contribute significantly to the explanation of the dependent variable (replacement cost).

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	23795728294.707	1	23795728294.707	22.368	.000[b]
	Residual	15957506251.411	15	1063833750.094		
	Total	39753234546.118	16			

A. Dependent Variable: Replacement Cost
B. Predictors: (Constant), Direct Damage

The degree of significance and F-Status value are shown in the table ANOVA test. The results of this test demonstrate that direct damage cost adds considerably to replacement cost, indicating that the modal is fit (F=22.368 & P=0.000).

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	12259.914	10873.602		1.127	.277
	DIRECTDAMAGE	1.109	.235	.774	4.729	.000

a. Dependent Variable: Replacement Cost

The unstandardized beta (B) in the above coefficient table indicates how many units the dependent variable changes for everyone unit change in the independent variable. In this case, the partial change in replacement cost due to one unit change in direct damage cost is 1.109, which is statistically significant at $p<0.05$, implying that replacement cost has significant relationship with direct damage cost accepting the alternative hypothesis.

ii) 2007 Twister

Table 7: Fundamental Estimate of Total Losses and Reconstruction Cost

Sr. #	Sector	Direct Damage Mil Rs	Indirect Losses Mil Rs	Total Losses Mil Rs	Reconstruction Costs* Mil Rs	Reconstruction Costs* Mil US$	Shares of Total Reconst. Costs (%)
1	**Social Infrastructure**	4,451	179	4,630	(9,653) 18,095 1/	(161) 302 1/	55.2
	1.1 Private Housing	2,750	179	2,929	(6,180) 14,622 1/	(103) 244 1/	44.6
	1.2 Health	94	-	94	579	10	1.8
	1.3 Education	1,599	-	1,599	2,883	48	8.8
	1.4 Environment	-	-	-	-	-	-
	1.5 Governance	8	-	8	12	-	-
2	**Physical Infrastructure**	7,818	2,511	10,329	11,027	184	33.6
	2.1 Transport and Communication 2/	2,970	2,438	5,408	4,810	80	14.7
	2.2 Water Supply and Sanitation	125	-	125	224	4	0.7
	2.3 Energy, Power and fuel	187	73	260	205	3	0.6
	2.4 Irrigation	4,536	-	4,536	5,788	96	17.7
3	**Economic Sectors 3/**	8,169	9,096	17,265	3,657	61	11.2
	3.1 Agriculture, livestock and Fishing	7,850	4,679	12,529	3,178	53	9.7
	3.2 Industry and Services	320	4,417	4,736	479	8	1.5
4	**Total=1+2+3(Rs. Mill)**	20,438	11,786	32,224	(24,337) 32,779 1/	(406) 546 1/	100
	Of which: Balochistan	15,056	8,616	23,671	(16,570) 21,488 1/	(276) 358 1/	65.6
	Sindh	5,419	3,170	8,589	(7,740) 11,264 1/	(129) 188 1/	34.4

(Asian Development Bank & World Bank, 2007)

Like 2005 quake the consequence of 2007 tornado likewise force enormous expenses as displayed in above table; the immediate harm cost is assessed to be PKR 20438 million and recreation expenses of harmed resources is assessed to be PKR 32779 million. To know huge connection between them correlation and regression tests has been led; there results are clarified as under:

Correlation

Correlations

		REPLACEMENT COST	DIRECT DAMAGE COST OF CYCLONE
REPLACEMENT COST	Pearson Correlation	1	.689**
	Sig. (2-tailed)		.005
	N	15	15
DIRECT DAMAGE COST	Pearson Correlation	.689**	1
	Sig. (2-tailed)	.005	
	N	15	15

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

The above table shows Bivariate correlation which is a tool that used to find out the relationships among dependent and independent variable, therefore the result also indicates that direct damage cost of cyclone has significant correlation with reconstruction cost with r=0.689 at p<0.01 significance level.

Regression Analysis

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.689[a]	.474	.434	5305.61633

a. Predictors: (Constant), DIRECT DAMAGE COST OF CYCLONE

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	330236382.307	1	330236382.307	11.731	.005[b]
	Residual	365944340.627	13	28149564.664		
	Total	696180722.933	14			

A. Dependent Variable: Replacement Cost

B. Predictors: (Constant), Direct Damage Cost of Cyclone

Linear regression is used to examine the predictability of the dependent variable with the independent variable. In modal summary table the value of R2 is 0.474 which means that 47.4% variation in reconstruction cost is explained by direct damage cost in the modal and in ANOVA table the value of F is 11.371which is significant at p=0.005<0.01 showing that overall regression modal is statistically significant or showing goodness of fit measure.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	1891.036	1931.346		.979	.345
	DIRECTDAMAGE	1.140	.333	.689	3.425	.005

a. Dependent Variable: REPLACEMENT COST

The above table shows that how much predictor individually contributes to the variation in dependent variable so as shown in direct damage cost of monetary assets in 2007 cyclone its p value is less than 0.05 (ß = 1.140, p<.05); indicating that this variable has significant amount of explaining variance in reconstruction cost which is the additional cost needed for rebuilding of damaged assets.

iii) 2010 Flood

Table 12: Estimate of Total Damage Costs by Sector

Sector	Direct Damages PKR millions	Indirect Losses PKR millions	Total Damage	
			PKR millions	USD millions
1. Social Infrastructure				
Housing	91,843	43,171	135,014	1,588
Health	1,562	2,661	4,222	50
Education	22,047	4,418	26,464	311
Subtotal	**115,451**	**50,249**	**165,700**	**1,949**
2. Physical Infrastructure				
Irrigation & Flood Management	23,600		23,600	278
Transport & Communications	62,491	50,420	112,911	1,328
Water Supply & Sanitation	3,194	6,112	9,306	109
Energy	13,184	13,116	26,300	309
Subtotal	**102,469**	**69,648**	**172,117**	**2,025**
3. Economic Sector				
Agriculture, Livestock & Fisheries	315,547	113,257	428,805	5,045
Private Sector & Industries	14,463	9,468	23,932	282
Financial Sector	110	57,141	57,251	674
Subtotal	**330,120**	**179,866**	**509,987**	**6,000**
4. Cross Cutting Sectors				
Governance	3,141	2,835	5,976	70
Environment	992		992	12
Subtotal	**4,133**	**2,835**	**6,968**	**82**
Total	**552,173**	**302,599**	**854,771**	**10,056**

(Asian Development Bank & World Bank, 2010)

Table 13: Estimate of Total Reconstruction Costs by Sector

Sector	Reconstruction Option 1		Reconstruction Option 2		Reconstruction Option 3	
	PKR millions	USD millions	PKR millions	USD millions	PKR millions	USD millions
1. Social Infrastructure						
Housing	126,075	1,483	143,676	1,690	187,491	2,206
Health	4,151	49	4,151	49	4,151	49
Education	42,907	505	42,907	505	42,907	505
Subtotal	***173,133***	***2,037***	***190,734***	***2,244***	***234,549***	***2,759***

2. Physical Infrastructure						
Irrigation & Flood Management	36,294	427	36,294	427	83,499	982
Transport & Communications	200,260	2,356	200,260	2,356	200,260	2,356
Water Supply & Sanitation	6,292	74	6,292	74	7,982	94
Energy	9,038	106	9,038	106	9,038	106
Subtotal	***251,884***	***2,963***	***251,884***	***2,963***	***300,779***	***3,539***
3. Economic Sector						
Agriculture, Livestock & Fisheries	21,879	257	56,925	670	89,134	1,049
Private Sector & Industries	8,636	102	8,636	102	10,923	129
Financial Sector	39,358	463	39,358	463	39,358	463
Social Protection & Livelihoods	58,076	683	58,076	683	58,076	683
Subtotal	***127,949***	***1,505***	***162,995***	***1,918***	***197,491***	***2,323***
4. Cross Cutting Sectors						
Governance	4,900	58	4,900	58	4,900	58
Disaster Risk Management	2,295	27	2,295	27	2,295	27
Environment	17,746	209	17,746	209	17,746	209
Subtotal	***24,941***	***293***	***24,941***	***293***	***24,941***	***293***
Total	**577,908**	**6,799**	**630,554**	**7,418**	**757,761**	**8,915**

(Asian Development Bank & World Bank, 2010)

This terrible catastrophe has also resulted in significant financial costs, as seen in the table above. Correlation and regression modals have been used in the same way as in previous catastrophes to determine if they are statistically significant:

Correlation

Correlations

		REPLACEMENT COST	DIRECT DAMAGE COST
REPLACEMENT COST	Pearson Correlation	1	.940**
	Sig. (2-tailed)		.000
	N	14	14
DIRECT DAMAGE COST	Pearson Correlation	.940**	1
	Sig. (2-tailed)	.000	
	N	14	14

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

As Pearson correlation indicates that whether two variables are associated with each other or not so in this the value of r=0.940 significant at p=0.000 showing strong relation between direct damage cost and reconstruction cost of monetary assets in 2010 flood.

Regression Analysis

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.940[a]	.884	.874	12585.83399

a. Predictors: (Constant), Direct Damage Cost

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	14495018954.934	1	14495018954.934	91.507	.000[b]
	Residual	1900838607.994	12	158403217.333		
	Total	16395857562.929	13			

A. Dependent Variable: Replacement Cost

B. Predictors: (Constant), Direct Damage Cost

In a linear regression study, R Square is a measure of how much variability in the dependent variable is explained by the predictor variable (Bordens & Abbott, 2011). Mitchell and Jolley (2010, p. 735) propose looking at the significance of a F test of ANOVA to see if the R-squared is significant. As a result, the value of R2 is 0.884, and the value of F=91.507 is significant at p=0.000, suggesting that the overall regression pattern is significant.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	5824.341	3967.250		1.468	.168
	DIRECTDAMAGE	1.112	.116	.940	9.566	.000

a. Dependent Variable: REPLACEMENT COST

As shown in direct damage cost of monetary assets in 2010 flood its p value is less than 0.05 indicating that this independent variable has significant amount of explaining variance in reconstruction cost of damaged assets ((ß = 1.112, p<.05).

DISCUSSION OF THE RESULTS

Based on secondary data and SPSS results, the findings support the hypothesis that major disasters such as earthquakes, cyclones, floods had a significant negative impact on the economy as well as imposing high costs such as direct damage, indirect loss, and monetary asset reconstruction. Because the p value of each catastrophe cost is less than 0.05, the statistical

results of the 2005 earthquake, 2007 cyclone, and 2010 flood also show that there is a strong linkage between direct damage costs and reconstruction costs.

CONCLUSION AND RECOMMENDATION

Suggestions

Citizens should be given clear roles and responsibilities in disaster management, as well as clear training on the various aspects of disasters and the benefits of prevention measures. Many women should be involved in disaster reduction and planning, while the community serves as a hub for partnerships with local and national disaster managers.

Conclusion and Recommendation

Global disaster management and humanitarian assistance requires a comprehensive plan that derives from the talent, infrastructure and promise of a business, government agency, and unpaid team. Good relations include connecting people, data and systems and organizations, which requires not only innovative technologies and socially accepted values, but also the removal of as many political and legal obstacles as possible. Pakistan's main objective is to keep the country safe and secure through strong efforts, a partnership of national power and citizenship. To reduce the time between natural disaster and response, disaster response must begin at the scene of the disaster. Information and communication technologies act as primary responders to help and alleviate the loss of life, property, family reunification and alleviate human suffering.

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