Sindh Univ. Res. Jour. (Sci. Ser.) vol. 47 (2) 199-204 (2015)

SINDH UNIVERSITY RESEARCH JOURNAL (SCIENCE SERIES)

Disasters in Pakistan: An Overview and Assessment

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Received 30th September 2014 and Revised 9th February 2015

Abstract: Disasters are natural phenomena that arise in different shapes such as earthquakes, floods, terrorist attacks etc. Whilst it may not be possible to prevent a disaster in all cases, the affect of disasters on society can be minimized by undertaking proper measures to mitigate its impact and that can only be done when impact of disaster are properly determined through loss estimation exercises. This paper focuses on different types of disasters, specifically floods, earthquakes and terrorism that are faced by Pakistan and their impact on the people and economy of the country. The paper discusses the lack of data required to assess the losses accurately, highlighting the absence of importance attached to mitigating and relief activities from the federal and local authorities.

Keywords: Disaster Management, Loss estimation, Direct losses, Earthquakes, Floods

1. INTRODUCTION

Through entire history, human beings have invariably been at risk of disasters and mishaps. Some disasters, such as the earthquake, floods, hurricanes, twisters, storms and tsunamis and accidents, such as bomb blasts and other terrorist attack cause heavy losses of life, injuries, disruption to roads and buildings, telecommunications and other lifeline systems. The disaster only takes seconds to happen, but its effects lasts for years. It was witnessed that effects of disasters are prolonged for years.

Every time when we experience any type of disaster, different organizations, NGO's, government and experts present estimates of the losses against the event which are broadly deviating with each other. This is done because all these estimates are used for different analysis and purposes. The researchers and government officials need such loss information as a basic parameter to take multiple decisions that are helpful for post disaster management and planning. Loss estimates presents a picture that highlights the exigency and requirements of equipments and other supports for rescue and rehabilitation process. These estimates are needed by the first responders to plan rescue operations and raised funds. Not only the rescue but decision makers need data to create policies and pre- disaster plans, decision makers also use trends to measures policy successes and failures. The loss estimation is not a simple task to perform; calculation for the losses of disasters is naturally complex for three reasons:

i) Disasters do not have only direct costs but also indirect costs.

ii) Losses due to disasters are a function based on the location and time of disaster, which make them difficult every time.

iii) Lastly, most of the losses associated with a disaster are intangible.

The lack of reliable and proper information on these losses is a barricade to effective and efficient disaster mitigation strategies. Therefore to improve the mitigation and response programs, there is a need to strengthen the efforts in collecting the data and compiling them in a manner that they produced better loss estimates. We can only work towards calculating close estimates to provide ball park values due to the following issues:

i) Expertise in estimation is required.

ii) It is not possible to produce disaster of similar magnitude and in the same direction.

iii) We must be very clear and able to understand what we need to estimate.

iv) Last but not least, we mostly base our estimates on past experience; that is not realistic because with the time many parameters are changed and we must know that every disaster is different from the other. We need to estimate it from the origin.

Direct Losses of a Disaster

The entire scenario we have discussed earlier leads to economic losses and loss to life. When we are performing the estimation exercise we are more focused on the direct losses of the disasters. The direct losses are estimated first as they directly related to the disaster and are of more significance at the earlier stages. We furthermore understand that significant losses during disasters are usually intangible and difficult to be able to assess, like private suffering, losing of loved ones, losing family secrets or treasures, as well as the disruption of daily workouts (National Research Council, 1999). Without a doubt, these kinds of loss may possibly at times be greater than the particular loss regarding primary physical devastation. Regardless of the significance of these kinds of loss, but the truly

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amazing problems lie inside objectively computing these to help make their particular utilization to correctly damage estimation. Consequently producing precise loss estimations, therefore concentrate on Direct Losses, because they are simpler to objectively calculate.

Direct Loss refers to the *physical destruction* caused by the disaster to human beings and property (National Research Council, 1999). "*In economic terms, physical destruction may be thought of as a loss in asset value (and is often referred to as the direct loss from the event), whereas the consequences of that destruction may be considered to be the loss of income and/or production and impacts on the environment that cannot be readily stated in monetary terms (all of which are included among a disaster's indirect impacts)"* (National Research Council, 1999).

The direct loss can be further divided into the following category (National Research Council, 1999):

i) Primary direct losses are those caused by instant damage brought on by the big event.

ii) Secondary direct losses are the consequences of the actual event.

iii) Reimbursed losses include loss claims reduction statements which are compensated through personal insurance companies or even authorities or government.

iv) Unreimbursed losses are the uncompensated influences that will subjects need to carry.

This is very unfortunate that in Pakistan mostly losses are unreimbursed losses which have to be bear by the victims themselves.

Why Pakistan Specific?

Pakistan has witnessed numerous disasters in the past. Due to the poverty considerations, it has potential vulnerability towards disasters. Pakistan had also suffered heavily in term of millions loss of lives, injuries and economy. Our research aims towards the evaluation of post calamity damages which provide local, provincial and federal officials support for calculating incurred damages from natural and manmade calamities. This shall cover a range of diverse damages and losses to building structures, lifelines and live stocks, human casualties, etc., however, our main objective is to calculate the estimated losses in term of cost and life that the country may suffer due to any disaster.

2. MATERIAL AND METHODS

Impact Of Disasters On Economy

It is witnessed that the disasters have a negative effect on the economic progress of the country. Until the exact costs of disaster are computed, the real economic impact will remain poorly understood and the benefits of disaster alleviation activities inaccurately evaluated (National Research Council, 1999), if at all. Complex models for loss estimations are developed by experts, such as Chi-Chi Earthquake Database Analysis and Management System (CEDAMS) (Jang, Lee and Chen, 2002), Estimation model proposed by McCormack and Rad based on ATC-13 (McCormack and Rad, 1997), HAZ-Taiwan model (Shaw, Yeh,Jean,Loh and Kuo, 2007), Public-domain HAZUS model (Grossi, 2000), Probabilistic Risk Analysis model proposed by Grossi (Grossi, Kunreuther and Windeler, 2005), Risk based Assessment model (Chiua and Chang 2012), Real-time flood Monitoring system (Chang,Tsai,Lai,Wu, Lien, Chang, Shiau,Liao and Lin, 2012). However the use of these models is not without controversy. Sometimes the rigid and inflexible nature of these models creates problems for the authorities. Different types of disasters have different effects; therefore they need to be dealt with differently. The authorities need to determine that the loss estimation is sufficiently complete, to enable effective action to be undertaken. We need to identify and determine the set of minimal prerequisites or attributes that are needed prior to perform effective estimation. Pakistan is dealing with different types of disasters at a time, which make this task more complex and of highest priority.

Earthquakes

Since 2001 Pakistan has been experiencing powerful earthquakes. These earthquakes have been imposing a heavy cost on the economy. Pakistan has been facing these problems since 2001, but the frequency and magnitude of such disasters has increased since 2005. The sad part is that no data is available, that indicates the necessity of a loss estimation that will itself drive the need for recording of appropriate data. During the year 2009-10 approximately 6% of GDP was lost (Economic Survey of Pakistan, 2009-10), in the year 2010-11 the official figure for losses borne by different sectors of the national economy were estimated near $68 billion (Economic Survey of Pakistan, 2010-11). The problem here is that no figures or estimates exist to focus on the actual impact of the earthquake, in a geographical sense or population sense. Even more fundamentally, the sources are based on government estimates, which themselves are based on scant data. Geography related disasters, result in geography related losses, which demand a geography based estimation approach.

Floods

In past couple of years floods have also resulted in destruction at a very large scale, annihilating agricultural facilities, lack of farm animals, as well as sufferings (SUPARCO, 2012). The first flood was witnessed in Jul/Aug2010 that affected around 20 million people and 7.5 million of them had been displaced (Ali, Sarwar and Sajjad, 2010). Then in the

monsoon season of 2011 Pakistan again faced huge losses to crops, infrastructure and more than 15 million people were affected this time (Ali, *et al.,* 2010). According to the PMD (Pakistan Metrological Department) and Flood Forecasting Division based on past experience forecast that on moderate level 30% – 50% of the area will be affected with floods. On widespread it can also reach up to 90%-95% of the area (NDMA, 2013). But the situation will depend on monsoon rain fall that is expected heavily this year also. The International Labour office (ILO) has reported that *"more than 5.3 million jobs may have been lost and/or affected as a result of the worst ever floods in the history of Pakistan that devastated more than 70 districts of Pakistan"* (ILO, 2013). Yet the implications of this job loss are neither unknown nor its secondary effects in the society.

One of the most significant documents in Pakistan is the Annual Economic Survey of Pakistan, compiled by the ministry of finance. The table below, with entries directly from the report, indicates the number of areas affected by the recent disasters. The direct and indirect losses due to floods can be estimated from the figures reported in the Economic Survey of Pakistan, 2010-2011 and 2011-2012.

The number of items affected by the disasters is very large, and yet the report is very scant in terms of the accuracy of its assessment, assuming there is one. Some of the sectors are mentioned in **(Table-1).** This is far more dominant for the issue of terrorism, as mentioned in the next section.

Table1: Sectors affected by the different disasters.

Sector	Affected due to
Growth and Investment	Earth Quakes, Floods, Terrorism, Power Failure and Short Fall, Unlawfulness
Agriculture	Floods
Manufacturing	Floods, Power Failure and Short Fall
Public Finance	Flood, power failure
Monetary Sector	Floods, terrorism, power failure
Inflation	Floods, Earth quakes, terrorism
Balance of Payments	Floods, Terrorism
Public Debt	Floods, Terrorism
Poverty	Floods, Earth quakes, terrorism, Power Failure and Short fall
Education	Floods, Earth quakes, terrorism
Health & Nutrition	Floods
Capital Markets	Terrorism
Energy	Power failure, terrorism
Transport and Communications	Floods, Earth quakes
Environment	Floods, Earth quakes
Population, Labor Force and Employment	Floods, Earth quakes, terrorism
Contingent Liabilities	Terrorism, Power failure
Tax Expenditure	Floods, Earth quakes, terrorism, power failure

Terrorism

Pakistan is very unfortunate as she is not only facing natural disasters but the loss is also exacerbated due to the terrorism. During 2009-10, a total of 1,906 terror attacks were recorded, resulting in thousands of people dead and hundreds of thousands people injured (Economic Survey of Pakistan, 2009-10). Billion's were lost in term of property and infrastructures. Terrorism is a major problem faced by the country that affects the infrastructure and lives of the citizens. Casualties in Terrorist activities in Pakistan from 2003 till July, 2013 are shown in the **(Fig.1)** (SATP, 2013), (NCMC, 2013):

Year	Civilians Casualties	Security Force Personnel	Terrorists	Total
2003	140	24	25	189
2004	435	184	244	863
2005	430	81	137	648
2006	608	325	538	1471
2007	1522	597	1479	3598
2008	2155	654	3906	6715
2009	2324	991	8389	11704
2010	1796	469	5170	7435
2011	2738	765	2800	6303
2012	3007	732	2472	6211
2013	1985	427	1263	3675
Total	**17140**	**5249**	**26423**	**48812**

Fig1: Casualties in terrorist violence during 2003 – 2013

The tourism and handicraft industry is of great importance for generating foreign reserves. Pakistan's diverse cultures, people and landscapes always attracted millions of people around the world. This industry is been badly disturbed by the terrorism. All business activities and factories are closed in Swat, Gilgit and FATA. The loss to this industry is roughly estimated over $500 million per annum. The details of casualties due to terrorism in Pakistan are compared with India and Srilanka (Saeed and Rehman, 2013).The details are shown in **(Table-2)** (Saeed and Rehman, 2013):

Table2: Comparison of casualties from 2006-2011.

Country	Deaths	Monthly Average	Daily Average
Pakistan	34738	526	17-18
India	12843	194	06-07
Srilanka	35309	534	17-18

In these areas terrorist target major landmarks and attack industrial sectors such as hotel and tourism. Terrorist threats have weakened the welfare of the nation. The major hotels in the Hotel and Tourism Industry of Pakistan today are Marriot, Pearl

Continental, Regent Plaza, Sheraton and the Holiday Inn hotel chains. There has always been a potential for tourism in Pakistan, as the region has no shortage of cultural tourist attractions. However, due to prevailing security issues in Pakistan, the industry has been deeply affected. Due to this reason Sheraton has announce closure of its operations in Pakistan. The backdrop of the global recession and persisting poor laws and situations in Pakistan have also resulted in a steep drop of revenue growth in the industry by 45 percent (Qamar and Sadia, 2009).

The estimation of costs due to terrorism is not so easy to estimate, for they lie significantly in the indirect losses range. So whilst loss of homes can be estimated, the real loss is much higher but difficult to quantify. We have considered the following logic to undertake a rough real cost of the effects of terrorism. In most urban areas, cost of the GWOT is not recognized, for the tribal areas do not contribute significantly to the GDP of Pakistan. Yet the GWOT has cost us significantly. It is clear that US/Pak operation in the tribal areas has resulted in greater polarization of the society and bred suicide bombers across the nation. The cost of this, in monetary terms can be estimated based on the increase in defense budgets as shown in **(Table-3)**

Table3: Pakistan Defense budget comparison over 14 years.

Financial Year	Total National Budget(Rs in Billion)	% of Budget
2002-03	742	19.68
2003-04	828	21.14
2004-05	903	21.48
2005-06	1099	20.38
2006-07	1315	19.01
2007-08	1874	14.67
2008-09	2009	14.73
2009-10	2403	14.27
2010-11	2764	15.99
2011-12	2767	17.89
2012-13	3203	18.4
2013-14	3985	15.75

If we notice the increase in percentage it does not reflect much, but if we compare the amount, it is increased 10% – 15% every year, as the amount of budget is also increasing and the defense sector getting the lion's share. Working backwards from 2013, one can state that the GWOT (Global War on Terror) has resulted in the Pakistan's defense budget being increased by 82bn in 2012-2013. This is the cost of protecting the nation from these attacks. The losses due to floods in the same year were estimated to have been 79bn. So the cost is high, but the begging question is how real it is.

3. RESULT AND DISCUSSION

A Sample Estimation Process

The floods had affected the area of Punjab and Sindh mostly. Many crops are destroyed but the cotton and rice are the most affected showing decline of 11.3% and 29.9% respectively. This shows that the same is being reflected in the growth of the country that also decreases. The areas that were contributing to the country's economy are now in need of relief, requiring resources for the rehabilitation of the people, their food, shelter and medicine. The budget has been adjusted and the money reserve for other development purpose is now used at these areas. The targeted revenues of Rs 1667 billion for fiscal year 2010-11was downward revised to Rs 1,588 billion showing a direct loss of 79 billion all due to floods, equivalent to a loss of about 5%. Given that the loss is 5%, if we assume that the required rehabilitation is equivalent to 5%, then the total loss to the country is 10%. This does not even take into account the indirect effects of the floods, or whether they will be able to recover within the year to their former state. Taken further, the social losses are even greater with the displacement of people from rural to urban and the subsequent economic burden on the urban areas.

Let us take the above example and use it as a basis for calculations of losses due to terrorist activities. One example is the riots followed by the bomb blast at the Light house on 28 December 2009. The violent crowd attacks the commercial centers of Bolton Market, Light House, Paper Market, and Allahwala market. Let us assume that 100 shops were gutted in the fire. Assume that each shop will cost Rs10million to rebuild. Let us also assume that the rebuilding will take one complete year. The traders who were the owners of the shops have two losses to bear. First is the cost of rebuilding the shop. Then there is the lost income due to the absence of the shop. The following represents a very simplistic approach to loss estimation:
Assume that 100 shops were engulfed and completely burned in the fire.

Assume that they were earning 0.1 million a month, corresponding to 1.2 million a year, amounting to 120 million for 100 shops.

Assuming they were paying taxes at a rate of 10%, this is a loss of 12 million to the exchequer.

The markets and buildings were burn out and were reported to have affected about 3,000 shops and the livelihoods of almost more than 10,000 people. The

total loss was estimated over Rs 30 billion (NSMC, 2013). The markets that were affected were Bolton Market, Light House, Paper Market, and Allahwala Market. Later reports present that the loss estimates were exceeded more than 4,000 shops and 40,000 effected families. Our analysis above is based on 100 shops. If we extend this to 4000 shops, then we have an estimated loss of about Rs480 million to the exchequer. And this based on a single event, in a single market.

Indirect Losses

In addition, if their turnover was 0.1million, let us assume they saved 10%, corresponding to 10,000. This 10,000 did not go into banks or other methods of saving. The estimation of these losses strays into indirect losses which exist but are very difficult to estimate with any degree of confidence. Some of the losses that occurred indirectly due to such situation includes following:

1. Socio-Political Effects: There are many problems that arise as a result of disasters. The disaster destroy the infrastructure and source of livelihood, causing people to migrate to urban areas which create problems of rehabilitation, water, food, health, education security etc for the displaced persons. It causes problems like chronic illiteracy, rampart corruption, problem of child labor, fast urbanization, sinking moral value and increase in unlawful activities. The political entities also pay attention to such disasters but not for the rebuilding or helping the victims, but to get maximum funding from the local and foreign agencies.

2. Movement towards criminal activity/terrorism: a very critical concern is the increase in criminal and terrorist activities. The panic situation that is arises due to the disaster always encourage and favor criminals to perform their illegal activities. The riots, robberies and killing of innocents are noticed frequently and many times that the intensity is on higher side.

3. Loss of employment: Of those that were shop owners, they were also employers. Hence, then trickledown effect exists whereby the socially less privileged are affected in greater proportion. Given that 40,000 shops were affected, and each employed 3 persons, then a staggering 120,000 people would have potentially lost employment. The costs are indirect, but present nonetheless.

4. Potential loss of business: Another concern is the business market in which the business was running. Including the direct loss there is a loss of running capital, new investments and returns which is a chain effort among different nature of business. All of these employers would be regarded as from the Small and Medium Enterprise (SME) sector, which is well known to be not only key to growth, but key to growth in Pakistan. There is no real estimate of the number of SME's in Karachi, and their contribution to the GDP. Many SME's are not registered with the government, but still contributing towards the economy. Each of these SME's are providing employment to 10 -90 persons as per rough estimates. If we just consider the registered SME's, they contribute around 25% to country exports and 30% to the GDP from their business (Saeed, 2009). Now, if we add the contribution from non-resisted industries the amount would be at higher side. Although such non registered SME's are not contributing directly to the country's economy but they are indirectly helping the country in meeting the local requirements, paying indirect taxes and providing employments to many. Karachi is known to be the business hub of the country, and SME's are suffering due to the prevailing law and order situations and are at great risk. In some areas have closed their operations, resulting in growing unemployment situation. And yet there is no way to estimate the loss incurred to the SME's and indirectly to the exchequer **(Table-4)**. The table 4 below lists the essential headings under which the GOP (Government of Pakistan) reports the state of the economy.

Table4: Economic loss suffered by GOP in different sectors.

Sector	Affected due to
Growth and Investment	Earth Quakes, Floods, Terrorism, Power Failure and Short Fall, Unlawfulness
Balance of Payments	Floods, Terrorism
Public Debt	Floods, Terrorism
Poverty	Floods, Earth quakes, terrorism, Power Failure and Short fall
Education	Floods, Earth quakes, terrorism
Capital Markets	Terrorism
Population, Labor Force and Employment	Floods, Earth quakes, terrorism
Tax Expenditure	Floods, Earth quakes, terrorism, power failure

5. CONCLUSION

The disaster management is one of the major problems faced by Pakistan. The economical state of Pakistan is not forgiving in terms of any lapse in terms of assessing the cost of disasters and the required planning to mitigate them in the future. Therefore there is an urgent need for loss estimation activity to indicate the actual monetary effects so that will be productive in taking prompt actions. We also need to encourage the local and federal government to attach importance to this based on the loss impact, and need for realization that a loss estimation process must be implemented that deals with issue comprehensively.

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