

Chapter 8

What Causes Economic Losses from Natural Disasters in India?

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ABSTRACT

The reported economic losses due to natural disasters show an increasing trend over time for India. This is due to the influence of three factors: bio-physical drivers, exposure and vulnerability. Normalising the influence of exposure and vulnerability of socio-economic factors, this chapter potentially detects the influence of climate, caused by natural climate variability as well as anthropogenic climate change, in determining the damages from natural disasters. It analyses the trends in both the reported and normalised economic losses from natural disasters in India during 1964 and 2012. Similar analysis is also carried out for a subset of major disaster events like cyclonic storms and floods. No significant trend is found either for the normalised damage costs from natural disasters or for individual extreme events like floods and cyclonic storms. The findings suggest that the increases in damage costs is due to higher exposure and vulnerability of the socio-economic conditions of those affected, and recommends for additional investments on infrastructure to strengthen the adaptive capacity of the vulnerable sections with respect to the socio-economic factors.

1. INTRODUCTION

The global economic losses due to natural disasters have increased over time, and are likely to increase in the foreseeable future, especially in the developing countries (Botzen and van den

Bergh, 2009; Intergovernmental Panel on Climate Change, hereafter, IPCC, 2012). The economic losses due to climate extremes were 1% of GDP (Gross Domestic Product) for developing nations during 2001-06, whereas it was 0.3% for low income nations and less than 0.1% for high

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income nations (IPCC, 2012). The recent ‘atlas of mortality and economic losses from weather, climate and extreme events’ by World Meteorological Organisation (WMO) reports that around 2,682 extreme events have occurred in Asia during 1970-2012, resulting in 0.92 million deaths and US\$ 798.8 billion (adjusted at 2012 prices) of economic damages (WMO, 2014). Most of these disasters were attributed to incidence of floods and cyclonic storms, i.e., 45% and 35%, respectively (WMO, 2014). Based on EM-DAT international disaster database, it is found that the total damage costs due to natural disasters in India were US\$ 2.92 billion during the 1970s. The extent of damage costs increased in the subsequent decades from US\$ 5.92 billion during the 1980s to US\$ 18.41 billion and US\$ 23.74 billion during 1990s and 2000s, respectively. Further, Padmanabhan (2012) reports that the total economic damages due to extreme events were US\$ 48.06 billion during the period 1980-2010 – this corresponds to an average of US\$ 1.55 billion per annum during the same period with the direct losses touching about 2% of India’s GDP.

It is imperative to note that the damages from natural disasters depend on: (i) climatic and geo-physical factors which derive the nature and intensity of a disaster event, and (ii) exposure and vulnerability of socio-economic factors that largely determine an event’s ex-post impact (Schmidt *et al.*, 2009; Neumayer and Barthel, 2011; IPCC, 2012; Bahinipati and Venkatachalam, 2014; Bahinipati and Patnaik, 2015). From a policy perspective, the onus is to reduce the potential impacts of natural disasters which calls for a better understanding of the drivers involved in the impact process. In order to estimate the influence of each of these factors, a ‘normalisation technique’ is being used in the literature, which isolates the role of climate and geo-physical factors from that of socio-economic factors to determine economic

costs due to natural disasters (Bahinipati and Venkatachalam, 2014). Most of the normalisation studies dealing with natural disasters so far mainly focused on a global scale or on developed countries, especially the USA and the Europe (Pielke and Landsea, 1998; Pielke and Downton, 2000; Pielke *et al.*, 2003, 2008; Barredo, 2009, 2010; Schmidt *et al.*, 2010; Neumayer and Barthel, 2011; e.g. *see* Bouwer, 2011 and Table 1), because of the availability of long-term quality data. While data constraints remain, it is essential to conduct normalisation exercise in developing country contexts, where the anticipated impacts of natural disasters are likely to increase in the foreseeable future (Stern, 2007; IPCC, 2012). To the best of our knowledge, no study seems to have attempted the normalisation exercise in the Indian context although a few studies do exist at the regional level. For instance, while Raghavan and Rajesh (2003) focus on cyclonic storms in Andhra Pradesh, Bahinipati and Venkatachalam (2014) analyse three extreme events, namely cyclones, floods and droughts, together in the context of Odisha.

Against this backdrop, this chapter attempts to fill in this gap and carry out a normalisation analysis for a better understanding of the magnitude of economic losses due to natural disasters that occurred in India between 1964 and 2012¹. The results are also validated by performing a similar type of analysis for individual disasters like floods and cyclonic storms, which are considered as the major extreme events in India. The objective of this chapter is to identify determinants of unprecedented increase in damage costs due to climate extremes in India. This chapter is structured as follows: the second section outlines theoretical underpinnings of normalisation technique, and the third section describes data and methods. Section four discusses empirical results, and the final section concludes with some policy suggestions.

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