

**INTERNATIONAL JOURNAL OF LAW  
MANAGEMENT & HUMANITIES**  
**[ISSN 2581-5369]**

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**Volume 3 | Issue 6**

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**2020**

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# Economic Impact of Natural Disasters

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## ABSTRACT

*Economic growth of a country is dependent on various factors such as the human capital, technology and natural resources. These resources are affected by the environmental factors and are often severely impacted by the uncontrollable forces of nature. Although, there have been several studies on the social impact of natural disasters, there is limited research on its correlation with economic growth. In this paper, the author has aims to highlight the impact of natural disasters on the economic growth trajectory of a country, with the help of secondary data available.*

**Keywords:** Natural Disasters, Economic Growth, Short-term, Long-term.

## I. INTRODUCTION

The Economy of a country, encompassing of all activities such as production, trade, investment, infrastructure, etc., is affected by and depends on various environmental factors. The availability and quality of human resources, technological developments, social and political factors and most importantly the availability of natural resources can define the trajectory of a country's economic growth. Economic growth can be defined as an increase in a country's economic ability, as compared to the past periods, to produce more goods and services. Economic growth is measured by the change in the Gross Domestic Product of a country, which is the representation of the total output of goods and services.

Optimised utilization of these human and natural resources can affect the country to a large extent. There is a large body of literature to understand the correlation between human capital and economic growth. Human capital can be explained as "the skills, aptitude, knowledge and qualities that facilitate the attainment of individual, social and economic welfare".<sup>2</sup> Studies have highlighted that enhancement in the human capital can lead to a positive economic growth. Similarly, there have been several studies that highlight the crucial role of technology in economic growth. Technological development makes very important contributions to the economic and social-cultural life.<sup>3</sup>

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<sup>2</sup> *The Well-being of Nations*, Organisations for Economic Co-operation and Development Publications (2001)

<sup>3</sup> Hulya Kesici Caliskan, *Technological Change and Economic Growth*, 195, *PROCEDIA*, 649, 653 (2015).

However, what we lack to understand is the impact of the uncontrollable forces of nature on the economy of a country.

Major natural disasters not only have severe negative short-run economic impacts but also appear to have adverse longer-term consequences for economic growth and development.<sup>4</sup>

*Therefore, it is essential to study the correlation between natural disaster and economic growth in order to be able to minimise the negative impacts.*

## II. MATERIAL AND METHOD

### (A) Objectives of the Study

The researcher has examined and evaluated the correlation of natural disasters and economic growth. In view of the above, the basic objectives of the study planned are given below.

To study the relationship between major natural disasters and economic growth of a country.

To study the impact of natural disasters on components of the economy; Infrastructure, Human Capital, Natural Resources, Investment, Production, etc.

### (B) Review Of Literature

An exhaustive review of literature is necessary for a comprehensive research. For the purpose of this study, the author has references from various literatures as follows.

**Petterson (2006)**, This research paper is focused on analysing the social, demographic and economic effects of the Katrina hurricane on the industries and infrastructures of the affected areas of U.S. The research paper also discusses in detail the impact on commercial fisheries. The paper concludes that the Katrina hurricane had a direct impact on the energy sector, ports and infrastructure. The U.S. labour department also noted job loss, business loss and labour shortage.

**Mobarak (2011)**, This paper discusses how the countries are affected by natural disasters, depending on their socio-economic characteristics, their level of development, and their inherent levels of natural disaster risk. This paper in brief analyses which countries are at the most risk of being hit by natural disasters and proceeds further to discuss its impact on countries. This paper concludes that “The most significant impacts are felt on short-run and long-run GDP, physical capital, human capital, labor markets and real estate markets”. This paper also analyses the mitigating factors that help a country handle these disasters as well as further suggests effective policies.

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<sup>4</sup> Charlotte Benson & Edward Clay, *Economic and Financial Impact of Natural Disasters*, (2003).

**Pantano (2013)**, This research paper studies the empirical data available to analyse the effects of natural disasters on the economic growth. The paper explores the data of 196 countries from 1970 to 2008. The research paper concludes that on the face value “only large natural disasters affect the subsequent performance of the economy” and that “Large disasters seem to have a lasting impact on GDP per capita when we define a large disaster to be one above the 99th percentile of the magnitude”. The research makes a unique conclusion that natural disasters are unlikely to affect the economic growth unless followed by a radical political revolution, yet the paper does not neglect the direct impact on livelihoods and infrastructure reconstruction.

**Loayza (2013)**, This research paper studies the effect of natural disasters in respect to the macroeconomics aftermath. This paper studies the GDP growth in both, its aggregate and non-agricultural components in respect to 4 types of natural disasters, that is, drought, floods, earthquakes and storms. The paper studies both severe and moderate natural disasters and suggests that since moderate disasters are easier to handle, the losses of these disasters can be compensated by redistribution of resources. The paper also concludes that severe disasters have a more detrimental impact.

### **(C) Research Methodology**

This paper is a doctrinal research paper and is based on secondary data. Primary data could not be collected due to several logistical and financial limitations. To gain a holistic understanding of the research questions, the author has studied and referred several articles, journals and papers pertaining to the objectives of this study.

## **III. STUDY AND FINDINGS**

### **Economic Impact**

The existing growth theories fail to provide robust information on the possible growth effects of natural disasters. The neoclassical theories suggest that natural disasters do not have any significant impact on technological progress and that disasters might increase growth in the short term by shifting economies from their normal growth paths. On the other hand, the endogenous growth models suggest negative effect of natural shocks on production and on economic growth. The growth models based on creative destruction theory advocate that there may be positive effects of natural disasters on economic growth, as the physical destruction caused by natural disasters may initiate greater investment in the reconstruction of

existing physical capital<sup>5</sup>.

*The inconclusiveness of the existing growth models in explaining the impact of natural disasters has motivated deeper research in this area.*

- **Short-term Impact**

Most of the current studies in this field find a negative impact of natural disasters on short-run economic growth. It is expected that Natural disasters disturb the economic activities in the short-run due the direct and indirect damages caused.

*Direct damages occur in two forms; (a) loss of labour which includes deaths and injuries; and (b) loss of capital which includes loss of physical assets or infrastructure.* These direct losses may result in a further loss of potential labour hours which can cause a decrease in the production output. The loss of labour hours and the subsequent decrease in the expected output may then impact the economic growth of the country, as the forgone production would have been added to the country's GDP if the disaster had not happened.

However, contrary to the findings that conclude negative impacts from disasters, some studies find that natural disasters may also have a positive impact on economic growth in the short-to-medium term as following a disastrous event, reinvestment in capital and upgraded technology may accelerate growth. Although, the effect of natural disasters may be non-uniform and heterogenous, certain basic patterns can be observed with the help of the empirical data available;

The negative impacts of relatively more severe natural disaster are observed to be even stronger since the large-scale destruction caused by such major natural disasters are more likely to decelerate economic growth<sup>6</sup>.

Developing countries are found to be more sensitive to the economic shocks of natural disasters than developed ones largely due to their limited capacity to cope with the financial consequences of such disasters<sup>7</sup>. The developing countries agriculture tends to be more susceptible to the destructive effects of nature than that of developed countries". This research studies the available data by the UNESCO that collects annual statistics on natural disasters. The paper concludes that due to the damaging effects of natural disasters Third World countries fail to attain self-sufficiency and there is need for these countries to

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<sup>5</sup> Vikrant Panwar & Subir Sen, *Economic Impact of Natural Disasters: An Empirical Re-Examination*, 13:1, JOUR. OF APP. ECO. RES., 109, 111 (2019).

<sup>6</sup> Thomas Fomby et al., *The Growth Aftermath of Natural Disasters*, 28:3, JOUR. OF APP. ECO., 412, 428 (2013)

<sup>7</sup> Id. at 5

incorporate planning for disaster control in national agriculture plan.<sup>8</sup>

Further, countries with higher levels of per capita income, more effective institutional frameworks, higher literacy rates, and greater trade openness etc., find it easier to absorb the economic shocks of natural disasters.<sup>9</sup>

*Recent studies, however, have found that the positive impacts of natural disasters were limited to specific economic sectors or even specific disaster types.*

For instance, droughts have an overall negative effect on GDP growth and the effect is stronger for agricultural sector. For agricultural sector the negative effect of droughts is felt immediately while for non-agricultural growth the negative impact is felt after a delay. Whereas, in contrast to the negative impact of droughts, floods have a positive impact on economic growth. Earthquakes, however, do not tend to have a statistically significant impact on GDP but with reconstruction activity following the damage to property after an earthquake brings in a positive effect.<sup>10</sup>

- **Long-term Impact**

The long-term economic consequences of natural disasters are not distinguishable according to research. Natural disasters may have negative, positive and even no impact on long-term economic growth and development.<sup>11</sup> However, like the short-term impact, natural disasters are expected to have a negative impact on long-term economic growth as well.

The damage to human and physical capital may shift the growth paths of countries experiencing natural disasters thereby causing a permanent negative impact in the long term.

Disruptions in health and education services are more likely to hamper the current human capital and the future accumulation of skilled human capital.

More severe natural disasters often create high opportunity costs. The impact is more pronounced for developing countries as the funds used for post-disaster response could have been used for other social welfare initiatives.

Moreover, frequently recurring disasters can create an atmosphere of uncertainty and hamper long-term investment prospects in a country.

As stated earlier, the long-term positive impact of natural disasters can be explained by

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<sup>8</sup> Frank Long, *The Impact of Natural Disasters on Third World Agriculture*, 37, AMR. JOUR. OF ECO. SOC., 149, 151 (1978).

<sup>9</sup> Matthew E. Kahn, *The Death Toll From Natural Disasters*, 87, REV. OF ECO. STAT., 271, 280 (2005)

<sup>10</sup> FOMBY, *supra* note 5

<sup>11</sup> Illan Noy & William DuPont, *The Long-term Consequences of Natural Disasters* (2016).

endogenous growth-models based on the Schumpeterian creative destruction theory. Such models predict that growth in a disaster-affected location may accelerate following a negative shock due to reconstruction activities which lead to higher in the economy in the long-run. Long-run growth rates may be affected as newer and more productive technologies replace outdated ones. Despite the destruction of capital, disasters increase the return to human capital by the adoption of newer and more productive technologies.<sup>12</sup>

As mentioned earlier, the macroeconomic consequences of natural disasters remain a relatively unexplored area of research mainly because of challenges of data and methodology. A comprehensive analysis in this regard may help in extending the framework to analyse the growth effects of natural disasters.

- **Human Capital**

Major Natural Disasters such as earthquakes, tsunamis, floods, famines etc., generate destruction on impact.<sup>13</sup> Natural disaster destroy infrastructure and tangible assets such as buildings and equipment as well as human capital resulting in loss of life. The recent Kerala Floods in 2019, the Haiti Earthquake in 2010, the Kashmir Earthquake in 2005, Hurricane Katrina in 2005, Indian Ocean Tsunami in 2004, etc., are a few amongst multiple major natural disasters around the world that alone resulted in over 5.6 million deaths and damage of property of over 150 billion USD. According to EM-DAT<sup>14</sup>, from 2000-2019, there have been approximately over 12 million deaths (Fig. 1).<sup>15</sup> (Hannah Ritchie, 2014).

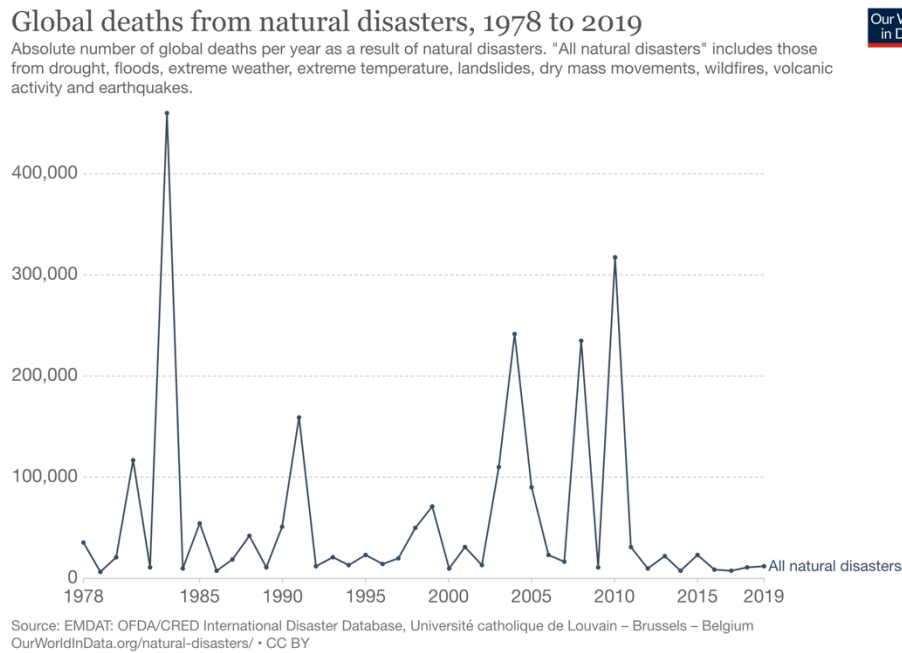
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<sup>12</sup> Mark Skidmore & Hideki Toya, *Do Natural Disasters Promote Long-Run Growth?*, 40:3, ECO. INQ., 664, 670 (2002).

<sup>13</sup> Eduardo Cavallo, *Catastrophic Natural Disasters and Economic Growth*, 95, REV. OF ECO. STAT., 1549, 1553 (2013).

<sup>14</sup> Emergency Events Database (EM-DAT) was created with the initial support of the World Health Organisation (WHO) and the Belgian Government. EM-DAT contains **essential core data** on the occurrence and effects of over 22,000 mass disasters in the world from 1900 to the present day. The database is compiled from various sources, including UN agencies, non-governmental organisations, insurance companies, research institutes and press agencies.

<sup>15</sup> Hannah Ritchie, *Natural Disasters*, Our World In Data (2014), <https://ourworldindata.org/natural-disasters>.



*Figure 1*

### • Labour Shortage

Natural disasters also affect labour markets following a natural disaster as labours flee the area. Labour shortages occur due to the loss of housing and physical infrastructure as a result of the damage done by the natural disaster. With respect to the Katrina Hurricane in 2005, the New Orleans Metropolitan area lost approximately 36% of its workforce in September 2005. In total more than 4,000,000 homes in this area were damaged. Furthermore large number of Labour shortages coexist with the high levels of unemployment.<sup>16</sup> The unemployment in New Orleans rose up to 14.8% in 2005 following the hurricane.<sup>17</sup>

On average, aggregate local employment falls by 3.4% following a flood event.<sup>18</sup> Income levels, however, increase as a result of the decrease in the labour supply and the simultaneous increase in post-disaster labour demand due to labour shortage. Another explanation for this growth in income rate is proving monetary compensation to workers in areas affected by the disaster where the quality of life has decreased and the areas lack amenities.<sup>19</sup>

<sup>16</sup> John S. Patterson et al., *A Preliminary Assessment of Social and Economic Impacts Associated with Hurricane Katrina*, 108, AMR. ANTH., 643, 656 (2006).

<sup>17</sup> David Lawder, *New Orleans loses 237,200 Jobs due Storms: Survey*, RED NOVA, (2005), <https://www.rednova.com>.

<sup>18</sup> Derek Kellenberg & A. Mushfiq Mobarak, *AN. REV. RES. ECO.*, 3, 297, 303 (2011).

<sup>19</sup> Id at 18

1	Hurricane Katrina (2005)	\$168 billion
2	Hurricane Harvey (2017)	\$130 billion
3	Hurricane Maria (2017)	\$93.6 billion
4	Hurricane Sandy (2012)	\$73.5 billion
5	Hurricane Irma (2017)	\$52 billion

*Table 1 Top 5 Costliest Disasters in United States since 1980*

#### **IV. SCOPE AND LIMITATION OF THE STUDY**

The author aims to study the correlation between natural disasters and its underlying impact on the economic growth and the various components of an economy. The author concludes that there is a limited amount of research to understand and analyse the economic impact of natural disasters and thus the author aims to fill this gap. The author has referred to various journals and articles for a comprehensive study. However, despite the sincere efforts made by the researcher, this study may not be holistic in nature as it suffers from inherent limitations. Primary data could not be collected due to several logistical limitations. Other inherent limitations this study suffers from are time and money based.

#### **V. CONCLUSION**

The author concludes that the impact of natural disasters is heterogeneous. However, largely natural disaster is expected to have a negative impact in the short-run as there is immediate loss of human capital and infrastructure. The author also concludes that there is loss of job opportunity, availability of labour pools that result in labour shortage and unemployment, however, the income levels witness a rise due to the shortage of labour and simultaneous increase in the demand for labour. Whereas, some disasters such as earthquakes, may show a positive impact in the long run as reconstruction and reinvestment follows a natural disaster. The author also concludes that disasters have varying impact on developed and developing countries, with developing being more sensitive to the aftermath as developing countries lack the resources to mitigate or manage the effects of natural disasters. The author states that there is a relatively limited number of researches in this field and to fill the gap, more comprehensive research is required.

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