



Scan to know paper details and
author's profile

Impact of Natural Disasters on Socio-Economic Development of Jammu and Kashmir

Farouq Ahmad Dar & Dr. Malkhan Singh

Barkatullah University

ABSTRACT

This article explores interaction between the natural disasters and socio-economic development. This study depicts the impact of natural disasters on the dwellers of Jammu and Kashmir. It also examines the resilience mechanism followed by people and measures implemented by the government in response to these natural disasters. The broad objective of this paper is to examine the various contributors of natural disasters which are related to Socio-economic development of a region. To know about the role of dynamic natural disasters on socio-economic development both offline and online available literature was examined.

Keywords: socio-economic development, natural disasters, jammu and kashmir, sustainable development, property loss.

Classification: DDC Code: 307.76091724 LCC Code: HT243.D44

Language: English



London
Journals Press

LJP Copyright ID: 573333
Print ISSN: 2515-5784
Online ISSN: 2515-5792

London Journal of Research in Humanities and Social Sciences

Volume 22 | Issue 8 | Compilation 1.0

© 2022 Farouq Ahmad Dar & Dr. Malkhan Singh. This is a research/review paper, distributed under the terms of the Creative Commons Attribution-Noncommercial 4.0 Unported License (<http://creativecommons.org/licenses/by-nc/4.0/>), permitting all noncommercial use, distribution, and reproduction in any medium, provided the original work is properly cited.



Impact of Natural Disasters on Socio-Economic Development of Jammu and Kashmir

Farouq Ahmad Dar^a & Dr. Malkhan Singh^a

ABSTRACT

This article explores interaction between the natural disasters and socio-economic development. This study depicts the impact of natural disasters on the dwellers of Jammu and Kashmir. It also examines the resilience mechanism followed by people and measures implemented by the government in response to these natural disasters. The broad objective of this paper is to examine the various contributors of natural disasters which are related to Socio-economic development of a region. To know about the role of dynamic natural disasters on socio-economic development both offline and online available literature was examined. The analysis of available literature depicts that there are links between disasters and resource management. The cross examine geographical literature suggests that Jammu and Kashmir is a disaster prone area which is affected by multiple natural disasters like earthquakes, avalanches, floods, climate change and landslides. These destructive disasters generally affect the different spheres of life and particularly the socio-economic development of a region. In order to diminish the disaster risk, the disaster risk reduction and management system, infrastructure and early warning system need to be strengthened. The need of the time is to develop the technology in such a manner to understand and cope the climate. The government should form an agenda that will help to reduce the frequency of natural disasters by implementing development policies and strategies to reduce the people's vulnerability. Government should design a sustainable development policy to meet the urgent needs as well as minimize the long term negative consequences of disasters. The analysis conclude that natural disasters have diverse

socio-economic impacts depending on nature, intensity and type of disaster.

Keywords: socio-economic development, natural disasters, jammu and kashmir, sustainable development, property loss.

Author a: Research Scholar, Department of Regional Planning and Economic Growth, Barkatullah University, Bhopal, Madhya Pradesh, 462026, 7889438402

e-mail: darfarouq16@gmail.com

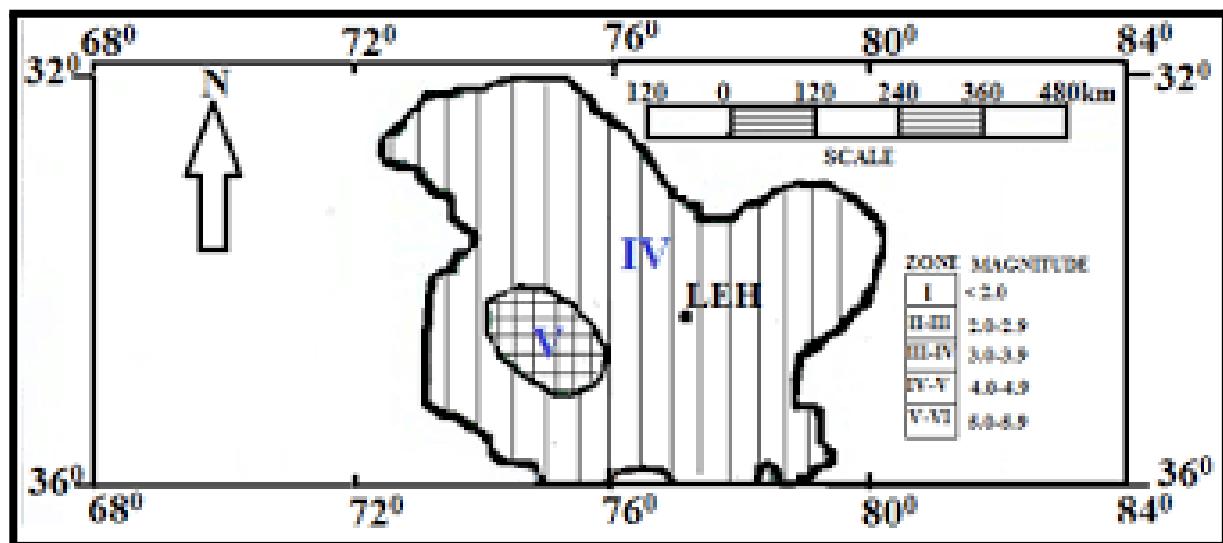
or: Professor, Department of Geography, Govt. Girls Nodal P.G. College, Vidisha, 46401, 7415879752
e-mail: malkhansingh1965@gmail.com

I. INTRODUCTION

Natural disasters are events which results in large-scale loss of life and damage to property. Natural disasters like earthquakes, droughts, floods and landslides are related to weather, geology or biology. Disaster refers to a catastrophe, calamity or a grave occurrence from natural or manmade activities which cannot be coped by the affected community (Disaster management Act, 2005). The manifestation of climate change lead to an increase in the prevalence of natural disasters especially floods and wind storms as they are related to temperature changes that takes place in the oceans. The movement of people towards high disaster-prone areas could be one reason for more recorded natural disasters especially in vulnerable countries. The high vulnerable and poor countries suffer from frequent disasters which avert it from development and from improving its resilience mechanism. Natural disasters caused by earthquakes, floods, volcano, avalanches and landslides has not changed markedly but there is a small and perceptible increase in the droughts. The growing evidence depicts that there is a comprehensive link between disasters, security

and economic development. It is easy to apprehend the short-term impact of natural disasters but the long-term impact of natural disasters remains uncertain (Chibber, A; Laajaj, R. 2008). The term “Disaster” may be defined, as an interruption of the functioning of a community or a society including widespread human, economic, environmental or material losses and surpasses the capacity of the affected community or society to cope using its own resources” (UNISDR, 2009). The natural and man-made disasters has affected most countries of the world which resulted in large-scale mortality and morbidity, creating millions of refugees, migrants, destroyed livelihoods and loss of property. Due to natural disasters around 1.3 million people were died between 1996 and 2015 in both developed as well as developing countries of the world. The low-income countries of the world were badly affected by disasters with mortality rates that were 5 times higher than high-income countries of the world. (UNISDR and CRED, 2016). India is affected by multiple disasters based on its topography, geology, geographical and climatic conditions and less socio-economic development. Natural disasters like earthquakes, floods, landslides and avalanches etc. killed 97,691 people in India from 1996 to 2015 which is the

fifth highest mortality rate in the world (UNISDR and CRED, 2016). The Union Territory Jammu and Kashmir is one of the most severely affected region by natural disasters. As a result of its topography and varying climatic conditions Jammu and Kashmir is prone to multiple natural hazards. The Union Territory Jammu and Kashmir has suffered massive floods, devastating earthquakes, avalanches and landslides (SDMP, 2017). The Union Territory has faced devastating earthquake in 2005, flash floods and landslides in 2010 and the massive flood of 2014 over the past 17 years (Kumar, Martha, and Roy, 2006; Gupta, Khanna, and Majumdar, 2012; SDMP, 2017). The natural disasters have adverse impact on socio-economic development of Jammu and Kashmir by devastating key sources of economy like agriculture sector, horticulture sector, handicrafts and tourism sector (Sharma, Sharma, and Waris, 2012). Kashmir valley comprising the districts of Srinagar, Ganderbal, Bandipora, Budgam, Baramulla, Kupwara, Anantnag and Pulwama, including Kishtwar, Doda and Ramban comes under seismic Zone V, consisting around 50% of the population of the Union Territory. The Jammu division including Union Territory Ladakh comes under Seismic Zone IV (NIDM, GOI, 2015)



[Source: [researchgate.net](https://www.researchgate.net)]

Fig. 1: Seismic Map of Jammu and Kashmir.

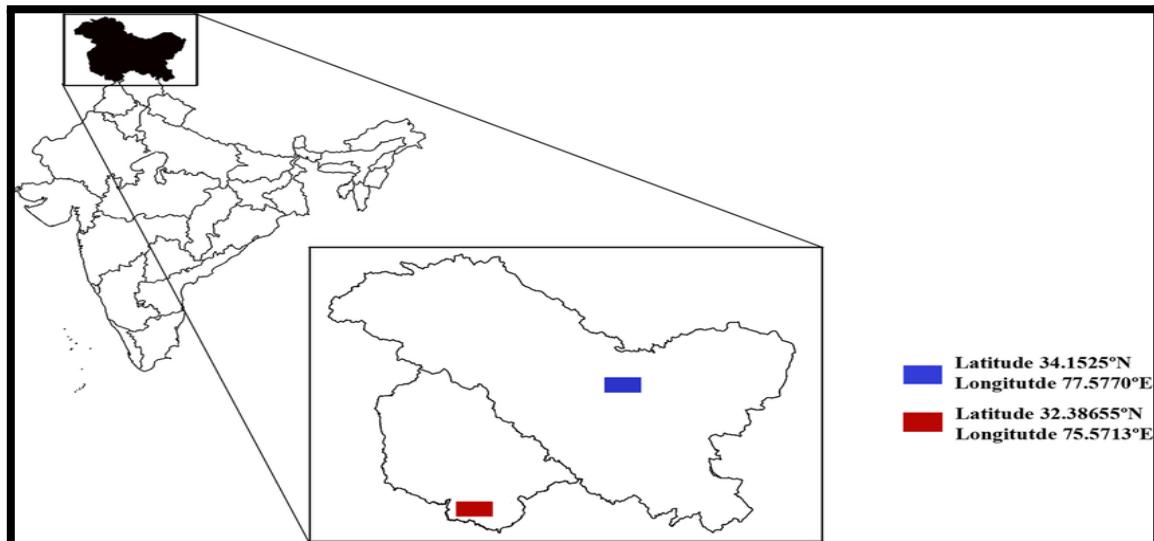
II. NATURAL HAZARDS IN THE UNION TERRITORY, JAMMU AND KASHMIR

The Jammu and Kashmir, a newly created Union Territory of India (until October 31, 2019, a state), is located in the northern part of Indian determined by the plains around Jammu to the south and by the valley of Kashmir to the North. In August 2019, the legislation passed a bill through which demotion the Jammu and Kashmir from statehood to union territory and carved out a part of it, known as the Ladakh region, into a separate union territory. Jammu and Kashmir, which was previously one of the largest princely states of India, is restricted to the east by the Indian Union Territory of Ladakh, to the south by the Indian states of Himachal Pradesh and Punjab, to the southwest by Pakistan and to the northwest by the Pakistani-administered portion of Kashmir (<https://www.britannica.com>). The state forms part of western Himalayan Zone. It has a hilly terrain, mountainous and undulating topography with altitude ranging from 1,850 to 3,048 meters above sea level. Total geographical area of union territory of Jammu and Kashmir is 42,241 sq.kms which is equal to 16,309 sq. miles (<https://en.m.wikipedia.org>). The Union Territory, Jammu and Kashmir lies spatially between the geo-coordinates of $33^{\circ} 23' 04.62''$ to $34^{\circ} 12' 27.18''$ N latitude and $74^{\circ} 15' 43.32''$ to $75^{\circ} 29' 01.32''$ E longitude (Yadav, K., Choudhry, P., & Deepak, A. 2016) with a total area of 42,241 sq. km. As the Union Territory, Jammu and Kashmir is the meeting point of some powers of the world and occupies a unique position in the political geography of India. The temperature of the Union Territory of Jammu and Kashmir varies from one season to another season throughout the year (Hussain, M. 2016). The Union Territory, Jammu and Kashmir has swelling topography with different practices and skills of the people to get their livelihood. Agriculture sector and other allied sectors plays a vital role for the socio-economic development of Union Territory, Jammu and Kashmir. Agriculture is the main source of livelihood for about 75% of population while wheat and paddy are the other two major crops. Goat and sheep rearing are the sources of livelihood for the nomadic people. Rain water is

the main source of irrigation followed by spring and canal irrigation (SDMP, 2017). The climatic conditions vary from temperate climate of valley to the tropical heat in Jammu. The region experiencing the maximum rainfall of about 1028 mm, the July and August month records the highest rainfall (IMD, 2014). The Kashmir valley is seismically active earthquake prone area (Ghaffar, A. and Abbas, S.F. 2010). The frequent earthquakes big and small will continue to occur and has occurred during the past. It is impossible to predict when and where an earthquake will occur and with what intensity (UNESO and UNDP, 2007). Kashmir valley lies between the Pir-Panjal and the Zanskar thrusts, located in North-western Himalayas making it vulnerable to earthquakes (IND, 2012). Kashmir valley is located in the western Himalayan mountain range on the site of a prehistoric lake which was created by the uplift of mountains which gradually silted in and alluvium from the mountains became the fertile soil of Kashmir valley. This is responsible for rich agricultural productivity of valley and its earthquake vulnerability (Langenbach, R. 2009). The Union Territory Jammu and Kashmir falls under the category of zone of weakness occupied by young folded mountains is subjected to severe crumpling of rock beds, resulting earthquakes of various intensity and magnitude (Hussain, M. 2000). The methodology to collect the data is mainly based on secondary sources of data. This article covers the broad objectives such as know about Jammu and Kashmir as prone to natural disasters. The Jammu and Srinagar capital cities are lying in the active seismic zones of IV and V at the national level. To examine the impact of floods, earthquakes, landslides and avalanches on the socio-economic development of Jammu & Kashmir. To provide some feasible suggestions that may prove valuable for mitigating the effect of natural disaster on economic development of Jammu and Kashmir. To provide information about the long-term economic impact of natural disasters. Generally negative impact is observed during the year of the shock, followed by an expansion and allowing a rapid return to the long-term equilibrium. The reduction of human and physical capital can hinder the long-term development of the country, especially when the

disasters are frequent. To examine that the theoretical as well as empirical studies of the long-term impact of natural disasters will differ according to the type of disaster, its frequency, the contribution of international aid and the socio-economic conditions of the country. To understand the link between natural disasters and vulnerability needs more attention, especially in those areas where population pressure is high, land degradation and desertification are increasing rapidly. To design further research on how the national and regional funding

mechanisms be expanded and how the inherent moral hazard and covariance could be reduced. To know more about climate change and adaptation where the focus is largely on technical issues but less attention has gone to the economic costs and benefits of different adaptation mechanisms. To learn more about natural disasters on a permanent and comprehensive basis will be a key for better understanding of adaptation to climate change. To frame such policies and strategies on socio-economic development that will build disaster risk mitigation more visible through the national plans.



[Source: [researchgate.net](https://www.researchgate.net)]

Fig. 2: Location Map of Jammu and Kashmir

The blue and red rectangles reflects the geo-coordinates of Union Territory of Ladakh and Union Territory of Jammu and Kashmir.

III. IMPACT OF FLOODS AND AVALANCHES ON SOCIO-ECONOMIC DEVELOPMENT

The valley of Kashmir is bowl shaped. It has vast variation in altitude and relief which make the low-lying areas of region prone to frequent floods. The two-major urban centres of region like Jammu and Srinagar in which wetlands such as lakes and ponds act as natural sponges have come down severely and resulting in frequent urban flooding (Gupta, 2014). Flash floods are dangerous and sudden actions that are usually triggered by a cloudburst or by the failure of dams. These floods trigger a high velocity current

of water, suppressing an area downstream within minutes or hours (SDMP, 2017). These floods usually occur in steep slope areas with their destructive nature results in huge damage. The human activities such as deforestation and unscientific road construction can trigger the landslides which worsen the effects of flash floods. Floods are generally as a result of overflow of water due to rainfall, melting of snow and other natural cause which submerges an area of land. The anthropogenic activities such as deforestation, rapid and unplanned urbanization, construction of bridges and dams without proper research, and changing pattern of vegetation are other causes that make an area more vulnerable to floods. The region Union Territory of Jammu and Kashmir is prone to floods because major rivers such as Jhelum, Chenab and Indus are flowing

through its populated areas (SDMP, 2017). In September 2014, it was heavy rainfall that led to one of the most severe, devastating and widespread instances of flooding in the Kashmir valley. Due to extreme heavy rainfall the Jhelum, Chenab and Tawi basins were overflowing from their embankments as the amount of rainfall received in these basins in just few days was 2-6 times more than the average normal rainfall received in the month of September (SDMP, 2017). Continuous rainfall from 1st to 6th September 2014, cause heavy flood in some parts of Jammu and most parts of Kashmir valley. The Jhelum, Chenab, Sindh and Lidder basins along with their tributaries where flowing above danger line. The river Jehlum in Srinagar was flowing 22.4 feet which was 4.40 feet above danger line, started flowing above embankments submerged hospitals, schools, residential buildings and other infrastructures. The flash flood water with sediment load swept away bridges in low lying areas of Kashmir region especially in Awantipora, Srinagar, Bemina, Sonawari and Qammarwari, etc. In Jammu region the flash flood washed away 400 residential houses, landslides are subjected to triggered by extreme heavy rainfall, all modes of transport and communication system like roadways, railways, mobile service connectivity and airways were blocked (Narain, S.2014). The agriculture sector suffered huge losses as crops were washed away, agricultural land was inundated and thousands of animals were perished by flash floods (Shah, Khwaja, Shah, et al., 2018). The flash flood of 2014 was followed by landslides that damaged buildings, roads and bridges. A major landslide took place in district Rajouri that washed away near about 50 people who were in a bus. The roadways across the region remains blocked including Jammu–Srinagar national highway which disrupts the relief measures (Gupta, 2014). The devastating flood damaged more than 80,000 pucca houses and about 21,000 kachha houses completely. More than 300 people were lost their lives and lakhs of people were displaced. The healthcare services four out of five hospitals in Kashmir were unable to function due to floods (Vithalani and Bansal, 2017). The dearth of medical facilities affected the weak members of

the society, such as the old and physically challenged persons and those persons suffering from chronic diseases such as diabetes and cancer. The sudden disruption of electricity and damaged equipment in GB Pant hospital in Srinagar resulted the deaths of 20 new-borns. There was a great impact on education system. The education of thousands of students in the Union Territory of Jammu and Kashmir was affected as many government and private school buildings were collapsed, leaving the students without essential infrastructure facilities (Venugopal and Yasir, 2017). After the floods, food security was a main issue before the present government. A study claimed that 36% respondents in Jammu and 86% respondents in Kashmir valley reported a gradual decrease in the food consumption (Sphere India, 2014). The flash flood have not only short-term impact but it also leads long-term socio-economic impact on the people of Jammu and Kashmir. The people of Jammu and Kashmir not only lost their dwellings but also lost their livelihood and livestock. The Federation of Chamber of Commerce estimated the economic loss of Jammu and Kashmir around \$15 billion till 2017 (Tabish and Nabil, 2015). The destruction caused severe psychological stress among the people of Jammu and Kashmir worsened existing mental health conditions. A study conducted 6 months after the flash flood 2014 in Kashmir labelled that 60% of the population was suffering from severe PTSD. The study depicts that elder members and women section of the society were more affected by mental health issues such as depression and PTSD in the aftermath of floods (Fatima and Maqbool, 2017). The presence of Himalayas in the region are prone to avalanches. The movement of snow down a mountain slope subjected to heavy snowfall which can be attributed to the rising global temperature because of climate change referred to as avalanche. One of the most destructive avalanche that hit the region during 1995, resulting the loss of 150 people and the closing of Jawahar Tunnel on the Jammu-Srinagar national highway (Hassan, 2014). Avalanches also have been proved deadly for the Indian armed forces as they are posted in inhospitable locations of the region. The

avalanche can bring down with it ice, trees, mud and rocks, therefore causing destruction of life and property (Rafiq and Mishra, 2018). An avalanche in Gurez sector occurred in 2017 killed around 20 army men and four civilians and posed great threat to a tourist place. Avalanches also lead to blocking of roadways, creating shortage of essential commodities, paralyze the life of communities living in the high mountain areas of Jammu and Kashmir, resulting in economic loss due to the impact on tourism and agricultural sector as large scale movement of snow causes soil erosion making the soil unproductive. The valley of Kashmir, Gurez, Kargil and Ladakh are the most avalanche-prone areas of the region. These are highly difficult to predict as avalanches occur over a short period of time. (Ganju and Dimri, 2004).

IV. IMPACT OF EARTHQUAKES ON SOCIO-ECONOMIC DEVELOPMENT

Jammu and Kashmir situated in the Himalayan region is an earthquake-prone area that falls under the most seismic active zones in India, zone IV and V. The region has been hit by several earthquakes over the years. In this region the history of earthquake goes back to 1505. Earthquakes in the Himalayan and Kashmir region pose serious challenges to the people. The Jammu and Kashmir has recorded 170 earthquakes between 1889 and 1990 (Hassan, 2014). The occurrence of earthquakes in this region is showing an increasing trend which is a matter of great concern. The disastrous earthquakes of 1555, 1885 and 2005 have hit the valley. The advent of earthquakes can't be controlled but their impact on population and environment can be minimized by undertaking proper mitigation strategies. The Jammu and Kashmir was hit by a catastrophic earthquake in 1555 but there is no data available to assign its magnitude and location. The region received another earthquake in 1885 witnessed one of the devastating earthquakes, the effects of which were felt from Srinagar, Gilgit to Shimla in the neighbouring state of Himachal Pradesh. It affected an area of 1, 00,000 sq. miles including Baramulla and Pattan (Lawrence, 1895). More

than 3,000 people were killed and many villages were completely destroyed. Kashmir region has remained the host of many devastating earthquakes from centuries (Ghaffar and Abbas, 2010). In the year 2005, a major earthquake with a magnitude of 7.6 on the Richter scale hit the border region between India and Pakistan which affected both the neighbouring countries. The earthquake was most destructive in nature, more than 80,000 people from Pakistan lost their lives, approximately 100,000 people from Pakistan and about 6300 people from India got serious injuries, resulting in an enormous humanitarian crisis. It is considered as the most devastating and destructive earthquake in the recorded history of the Himalayan region (Anees and Bhat, 2016). There was severe damage on residential buildings, 121 buildings collapsed completely, among them about 25% buildings were belonged to Uri and Poonch towns, bridges were collapsed and roads were blocked. Frequent earthquakes cause immediate destruction and lead long-term impact on the socio-economic condition of people in the region (Kumar et al. 2006). The collapsed houses left entire families homeless. The impact of earthquakes on hospitals and government buildings disturbed health and other essential services when they were most needed in the region. The devastating earthquakes also had serious impacts on the women of Jammu and Kashmir. The women faced a problem of personal insecurity and psychological stress due to lack of essential facilities like sanitation and food as they are the caretaker of their families. The dearth of medical and reproductive facilities had severe impact on the pregnant women (Hamilton and Halvorson, 2007).

V. IMPACT OF LANDSLIDES ON SOCIO-ECONOMIC DEVELOPMENT

Geological hazards like landslides are common in Jammu and Kashmir. This region is having young mountain ranges with a fragile rock base. When the stability of the slope gets disturbed, the region is subjected to trigger a flow of debris, mud and rocks. The earthquakes, cloudbursts and heavy rainfall can trigger the landslides. Besides these, there are some anthropogenic activities like

deforestation, overgrazing, road construction, dam building etc. that have further increased vulnerability of area (Singh, Bhat, Sharma, et al., 2012). The vulnerability shadow and economic impact are the concepts that are applied to other discrete climatic driven events that have the potential to close parts of the road network such as flood events. Due to climate change the landslides and flood events generally increase in their frequency (Galbraith et al., 2005; Anon., 2011; Winter et al., 2010; Winter & Shearer, 2013). The geographical extent of vulnerability shadow can be determined by the transport network, including closures and diversionary routes, rather than relatively small footprint events itself (Winter and Bromhead, 2012). The economic impact of a landslide and its associated vulnerability shadow are categorised in to three types like direct economic impact, direct consequential economic impact and indirect consequential economic impact (Winter and Bromhead, 2012). The main areas of Jammu and Kashmir which are prone to landslides include Bandipora, Anantnag, Pulwama, Shopian, Doda and Kishtwar being highly susceptible (SDMP, 2017). The downward movement of landslide from the hills had impact on houses, hospitals, bridges, roads, farmlands and other infrastructures. The disturbed hospital services and dearth of sanitation facilities affected the public health severely (SDMP, 2017; Gupta, Khanna, and Majumdar, 2012). The unplanned construction of roads and dams are the main causes of landslides in the region (Singh et al. 2012). The landslides also results in dearth of essential commodities in Kashmir valley, creating shortage of fuel and vegetables which results in increasing prices. The cultural and religious activities such as the Amarnath yatra have also been interrupted due to landslides. It also draws impact on the lives of farmers and nomadic communities that live in the hilly regions. The transhumance ship of nomadic communities also gets affected by the landslides as they cover larger area and prevent them from grazing their animals (Anees and Bhat, 2016). One of the major landslide on the Batote-Doda road along National Highway 1B in 2009 trigger due to slope failure resulting from the construction of Baglihar

hydro-power project. The catastrophic landslide washed away 150 m of highway, killed one person, affected the livelihood and food security of 600,000 people for a time period of one month (Singh, Bhat, Sharma, et al., 2012). Mining in the region takes place in the highly landslide-prone areas, endangers the environment and creating a malicious cycle. During landslides the highways and roadways are blocked which influences normal life across the region. The Jammu-Srinagar highway known as lifeline of Kashmir valley often gets blocked due to landslides in every year which results in hundreds of vehicles being stranded (Indian Express, 2018).

VI. IMPACT OF CLIMATE CHANGE ON SOCIO-ECONOMIC DEVELOPMENT

The hilly terrain of Jammu and Kashmir play a main role on supporting economy, which depend heavily on the water towers for hydroelectricity, agriculture, water supply, horticulture and tourism. The Union Territory J&K also holds significant importance in terms of socio-cultural diversity, biological diversity and ecological-wealth. The mountains of Jammu and Kashmir are both pride and necessity of the region. The socio-economic dependent of the region is mainly dependent on natural resources and climatic conditions. The climate change concerns of the region are multifaceted including floods, landslides, human health, biodiversity, droughts, endangered species, food security, agriculture and livelihood (G. C. S. NEGI.). The possible future effects of global climate change include increase in temperature, floods, wildfires, intense rainfall, snowstorms, windstorms, hailstorms, landslides, floods and diseases etc. The climate change pose a serious threat to the agriculture and horticulture sector in the region. It also leads effects on water resources, habitats, forests, tourism, species diversity, wildlife and livelihood in the region. Temperature, precipitation, humidity and cold waves are the agents that lead to impact on agriculture sector. Due to reduction in rainfall, the rain-fed agriculture suffered the most. Due to decline in snowfall the horticultural crops also decline in production. Climate change also leads impacts on

human health. It also leads impacts on vegetation patterns, their distribution, structure and ecology of forests across the globe. More and more paddy land is converted into rain fed or dry land in the districts of Anantnag, Pulwama, Kulgam, Shopian, Baramulla, Bandipora and Badgam in the recent years. It is estimated that area under apple cultivation increased but yield per hectare has decline in the region (Climate Change. 2014). Climate change is projected to influence the

hydrological cycle due to evapotranspiration, decrease in fresh water availability and reduction in snow cover. The sustainability of tourism in the region is highly dependent on climate change (INCCA). The sustainable development approach in view of climate change is possible only when there is balance between sustainable economy and sustainable environment by creating sustainable livelihoods in the region (Excelsior, 2021). The details of loss of human life due to natural disasters are presented in the table number1.

Table 1: Analysis of Natural Disasters and their impact on human life

Year	Earthquake		Flood		Avalanche		Landslide		Total	
	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured
1885	3000	-	-	-	-	-	-	-	3000	-
1995	-	-	-	-	150	-	-	-	150	-
2005	80000	106300	-	-	-	-	-	-	80000	106300
2014	-	-	320	-	-	-	50	-	370	-
2017	-	-	-	-	20	-	-	-	20	-
Total	110000	106300	320	-	170	-	50	-	110540	106300

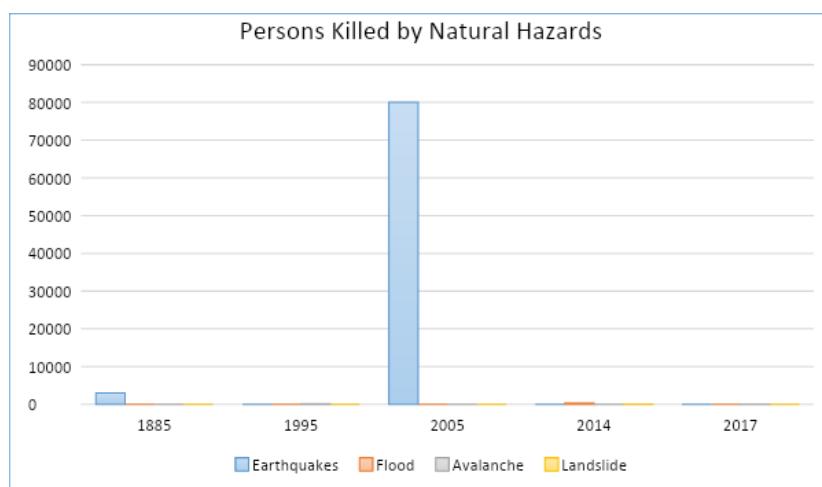


Fig. 3: Number of persons killed by natural hazards from 1885 to 2017.

The Table 1 reflects that total number of persons killed due to earthquakes was 110000 from the period of 1885 to 2017 in Jammu and Kashmir. The figure includes the persons killed in Pakistan Occupied Kashmir also. There were 106300 persons injured due to disastrous earthquakes both in Pakistan Occupied Kashmir and Indian Occupied Kashmir during the previous decades. The figure in the table depicts that 320 persons were killed due to flash flood of 2014. The persons killed due to avalanche was 170 and the number of persons killed due to landslide was 50. The earthquake of 2005 was most disastrous which alone takes the death toll of 80000 persons and 106300 persons were injured. The data also reflects that the total number of persons killed due to natural disasters in Jammu and Kashmir was 110540 during the period of 1858 to 2017 and the total number of injured persons were 106300 (Fig.3).

VII. MEASURES OF GOVERNMENT AND NON-GOVERNMENT AGENCIES ON DISASTER RESILIENCE

After the natural disasters the government and non-government agencies came forward to adopt various mechanisms to cope the situation linked to the vulnerability of an individual or a group which is linked to social-economic conditions of the society (SDMP, 2017). Similarly, after the flood in 2014, student organizations of Kashmir came forward from Delhi and other parts of India and played an important role in helping the people to cope with the natural hazards (Venugopal and Yasir, 2017). The central government has also followed a policy to provide relief and sanctioned \$720 million in multiple packages to the government of Jammu and Kashmir for relief and rehabilitation of people who are affected due to flash flood of 2014 (SDMP, 2017). In the year 2018, an avalanche hit the region then the government provided a relief of \$5715 to the family holders of those who were killed and \$172 to those who were injured in accordance from the State Disaster Relief Fund (SDRF, 2015). The central government has attempted to link Disaster Risk Reduction with different schemes and policies such as Mahatma

Gandhi National Rural Employment Guarantee Act (MGNREGA) and Indira Awas Yojana to improve the capacities to cope the vulnerable sections of the society (SDMP, 2017). The disaster risk reduction management programme MGNREGA launched by central government in order to generate work related to water harvesting, flood control in water-logged areas, management of irrigation canals, plantation of trees and renovation of traditional water bodies (SDRF, 2015). The government and non-government organisations has started self-help groups for women to empower them to generate micro-credit schemes, self-employment activities to engage them with carpet weaving, goat and sheep rearing to make them active participants to enhance the socio-economic development of the region and increase its resilience to disasters (Irshad and Bhat, 2015).

The Jammu and Kashmir government provide good quality seeds, fertilizers and water management facilities to the farmers to achieve a suitable growth rate of 4% in the agricultural sector to enhance the socio-economic development of the region (GOJ&K, 2013).

VIII. CONCLUSION

The present study has managed a widespread overview related to impacts of natural disasters on the lives of people living in the region of Jammu and Kashmir. The study recommends that it is the need of time to strength the effective disaster risk reduction and management system, enhance the early warning system by nodal agencies like Indian meteorological department to mitigate the impact of disasters and strength the infrastructural facilities like schools, roads, buildings and bridges. The construction of infrastructure should be strictly as per geological and civil engineering guidelines, so that there should be least impact of disasters like floods and earthquakes on the infrastructure. The study emphasis that there should be a local train group which will help in the emergency phase by rescuing those people which are affected by disasters, which will provide first aid by knowing evacuation routes and communicate for help, before help from other side is provided. The study

emphasis that there is the need to reduce the underlying vulnerabilities of population through different community development programmes for their socio-economic development. The government should frame a disaster cycle of preparedness, response, reconstruction and mitigation to ensure the safety of people living in the region. The government should make such strategies that will help to improve the resilience of communities and should be implemented in a sustainable way by taking into account the risks posed by natural disasters. The study recommends in-depth research to make ensure that resilience measures with regard to natural disasters in the region are appropriately addressed.

REFERENCES

1. Anees, S.U., and Bhat, M.S. (2016). History of Natural Disasters in Kashmir Valley, Jammu and Kashmir with Special Reference to Earthquakes. *International Journal of Innovative Research in Science, Engineering and Technology*, 5(9):17163-71.
2. Anon. (2011). Scottish road network climate change study: UKCPO9 update. Transport Scotland, Edinburgh.
3. Chhibber, A. and Laajaj, R. (2008). Natural Disasters and Economic Development Impact, Response and Preparedness. 5-7.
4. Climate Change and India: A 4 x 4 Assessment - A Sectoral and Regional Analysis for 2030s (INCCA).
5. Climate Change. (2014). Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Fifth Assessment Report of the IPCC.
6. Disaster Management Act. (2005). Jammu and Kashmir state disaster management Policy. P. No 24.
7. Fatima, Z., and Maqbool, S. (2017). Prevalence of Post-traumatic Stress Disorder and Depression among Flood Affected Individuals of Kashmir after Six Months of Flood. *International Journal of Applied Research*, 3(6):184-8.
8. Galbraith, R. M., Price, D. J. and Shackman, L. (Eds.). (2005). Scottish road network climate change study, 100p. Scottish Executive, Edinburgh.
9. Ganju, A. and Dimri, A. P. (2004). Prevention and Mitigation of Avalanche Disasters in Western Himalayan Region. *Natural Hazards*, 31(2):357-71.
10. Ghaffar, A. and Abbas, S. F. (2010). "An Overview of Past History Based on Seismicity Pattern of Kashmir Region, An Interpretation from 2005 Earthquake", *The Journal of Animal and Plant Sciences*, 20 (4): 297-304.
11. GOJ&K. (2015). Schemes of the Rehabilitation Council. Kashmir: Social Welfare Department, Government of Jammu and Kashmir.
12. Gupta, A.K. (2014). Loss of Life in Kashmir: A Tale of Man Made Disaster. New Delhi: The Water Digest Report. P8-25.
13. Gupta, P., Khanna, A., and Majumdar, S. (2012). Disaster Management in Flash Floods in Leh (Ladakh): A Case Study. *Indian Journal of Community Medicine*, 37(3):185-90.
14. Hamilton, J. P., and Halvorson, S. J. (2007). The 2005 Kashmir Earthquake: A Perspective on Women's Experiences. *Mountain Research and Development*, 27(4):296-301.
15. Hassan, R. (2014). Disasters in Kashmir: Impact and Response. *Journal of Humanities and Social Science*, 19(7):32-42.
<https://en.m.wikipedia.org>
<https://www.britannica.com>
<https://www.dailyexcelsior.com>
16. Husain, M. (2000). "Systematic Geography of Jammu and Kashmir", Delhi: Rawat Publications, p. 73-79
17. Hussain, M. (2016). Geography of Jammu and Kashmir 5th Ed. Rajesh Publication, New Delhi.
18. IMD. (2014). Climate of Jammu and Kashmir. Indian: Indian Meteorological Department.
19. Impact of climate change on the western Himalayan mountain ecosystems: An overview by G. C. S. NEGI.
20. IND: Jammu and Kashmir Urban Sector Development Investment Program. (2012).Jammu City Urban Road Subproject, p. 15.
21. Indian Express. (2018). Landslide Blocks Jammu-Srinagar Highway. Noida: Indian Express.

22. Irshad, I. A. and Bhat, A. A. (2015). The Vitality and Role of Self-help Groups (SHGs) in Women Upliftment: Special Reference to Kashmir. *International Journal of Research Granthaalayah*, 3(8):105-110.

23. Kumar, K. V., Martha, T. R., and Roy, P.S. (2006). Mapping Damage in the Jammu and Kashmir Caused by 8 October 2005 Mw 7.3 Earthquake from the Cartosat-1 and Resourcesat-1 Imagery. *International Journal of Remote Sensing*, 27(20):4449-59.

24. Kumar, K.V., Martha, T. R., and Roy, P.S. (2006). Mapping Damage in the Jammu and Kashmir Caused by 8 October 2005 Mw 7.3 Earthquake from the Cartosat-1 and Resourcesat-1 Imagery. *International Journal of Remote Sensing*, 27(20):4449-59

25. Langenbach, R. (2009). "Don't tear it Down: Preserving the Earthquake Resistant Vernacular Architecture of Kashmir", United Nations Educational, Scientific and Cultural Organization (UNESCO), California: Oinfroin Media, Oakland.

26. Lawrence, W.R. (1895). "The valley of Kashmir", London: Henry Froude, p. 478.

27. Narain, S. (2014). CSE director general, what caused the J&K floods: urbanization, poor planning and climate change?

28. National Institute of Disaster Management. (2015). Government of India.

29. Rafiq, M. and Mishra, A.K. (2018). A Study of Heavy Snowfall in Kashmir, India in January 2017. *Weather*, 73(1):15-7.

30. SDMP. (2017). State Disaster Management Plan. India: Department of Disaster Management, Relief, Rehabilitation and Construction, Government of Jammu and Kashmir.

31. SDRF. (2015). Items and Norms of Assistance from the State Disaster Response Fund (SDRF) and the National Disaster Response Fund (NDRF) for the Period 2015-2020. India: Government of India.

32. Shah, A. A., Khwaja, S., Shah, B. A., Reduan, Q. and Jawi, Z. (2018). Living with Earthquake and Flood Hazards in Jammu and Kashmir, NW Himalaya. *Frontiers in Earth Science*, 6:179.

33. Sharma, R., Sharma, V.K. and Waris, V.S. (2012). Impact of Peace and Disturbances on Tourism and Horticulture in Jammu and Kashmir. *International Journal of Scientific and Research Publications*, 2(6):1-7.

34. Singh, Y., Bhat, G.M., Sharma, V., Pandita, S.K., and Thakur, K.K. (2012). Reservoir Induced Landslide at Assar, Jammu and Kashmir: A Case Study. *Journal of the Geological Society of India*, 80(3):435-9.

35. Sphere India. (2014). Joint Rapid Needs Assessment Report: Jammu and Kashmir Floods 2014.

36. Tabish, S.A., and Nabil, S. (2015). Epic Tragedy: Jammu and Kashmir Floods: A Clarion Call. *Emergency Medicine: Open Access*, 5(2):1-8.

37. UNISDR and CRED. (2016). Poverty and Death: Disaster Mortality, 1996-2015. Brussels, Belgium: Centre for Research on the Epidemiology of Disasters.

38. UNISDR. (2009). Terminology for Disaster Risk Reduction. Geneva, Switzerland: United Nations International Strategy for Disaster Reduction.

39. United Nations Educational, Scientific and Cultural Organization (UNESCO) and United Nations Development Programme (UNDP) India. (2007). "Introduction to Area" In Manual for Restoration and Retrofitting of Rural Structures in Kashmir: How to Reduce Vulnerability of Existing Structures in Earthquake Affected Areas of Jammu and Kashmir, New Delhi. p. 6-8 and 20-38.

40. Venugopal, R., and Yasir, S. (2017). The Politics of Natural Disasters in Protracted Conflict: The 2014 Flood in Kashmir. *Oxford Development Studies*, 45(4):424-42.

41. Vithalani, K. R., and Bansal, N. (2017). Causes and Effect of Kashmir Flood. *International Journal of Advance Research, Ideas and Innovations in Technology*, 3(6):863-9.

42. Winter, M. G. and Bromhead, E. N. (2012). Landslide risk: some issues that determine societal acceptance. *Natural Hazards*, 62, 169-187.

43. Winter, M. G. and Shearer, B. (2013). Climate change and landslide hazard and risk - a Scottish perspective. Published Project Report

PPR 650. Transport Research Laboratory,
Wokingham.

44. Winter, M. G., Dent, J., Macgregor, F., Dempsey, P., Motion, A. and Shackman, L. (2010). Debris flow, rainfall and climate change in Scotland. *Quarterly Journal of Engineering Geology & Hydrogeology*, 43, 429-446.
45. Yadav, K., Choudhry, P., and Deepak, A. (2016). *Know your state Jammu and Kashmir*. Arihant Publication, Meerut India. p35.