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## **Climate Change in South Asia and Regional Initiatives**

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### **ABSTRACT**

South Asia has a very diverse climate. Half of the climate zones that exist on Earth can be found in South Asia. Such diversified climatic zones make the region prone to a wide range of climate change impacts like glacial melt, forest fires, rising sea levels, mountain and coastal soil erosion, and saline water intrusion. It is said that, “not war; climate change might devastate South Asia”. For a long time security was understood based on military terms and in the aftermath of the cold war, security is far more contested idea with multiple sources of threats which includes climate change and environmental security also. Environmental security in general and Climate Change in particular, by its very nature is transnational in context; hence these threats are likely to affect both the national and human security. This article has made an attempt to discuss the impacts of climate change on South Asian countries and the attempts made by the region to address the issue.

**Keywords:** Climate Change, South Asia, SAARC, Regional Cooperation

### **1. INTRODUCTION**

South Asia is a sub region of Asia and is sometimes also referred to as Indian Sub-continent. The region comprises of eight nations, namely, Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka. The region occupies approximately 3.5 per cent of the world's land area, however accounts to around one-fourth i.e. 24 per cent of the world's population. The region lies between Himalayan mountain ranges in the north and Indian Ocean in the south; and Ganges in the east and the Indus river valleys in the west. It is surrounded on the three sides by the Arabian Sea, the Indian Ocean and the Bay of Bengal. It has diverse geo-physical features which has made the region a rich depository of natural resources and ecosystem.

The countries of South Asia share common eco-systems, as a result, most of the environment related threats are of similar nature, though the degree of intensity varies from country to country. One such threat which South Asia is vulnerable to is that of Climate

Change. The South Asian countries, though not significant contributors to the threat (South Asia contributes just 7% of global GHG emissions)<sup>1</sup> are extremely susceptible to the disasters related to climate change like – rise in temperature, melting of glaciers, rise in sea level, uneven rainfall, floods, droughts, forest fires and cyclones. The problem is further intensified due to over population, as South Asia is the most populated geographical region in the world. Further it is combined with the issue of extreme poverty. The region has more than 600 million people living in absolute poverty which accounts to more than half of the world's total poor. In addition, the people for their livelihood are largely dependent on climate sensitive sectors like agriculture, forestry, fishing etc. on which climate change has a very adverse effect.<sup>2</sup> In this context the paper tries to discuss the impact of climate change on South Asia and the regional response.

## **2. CLIMATE CHANGE**

Weather is a state of atmosphere – its temperature, humidity, wind, rainfall etc. at a particular place and time. It is influenced by ocean and other water bodies, land surfaces, snow and ice sheets etc. which together with atmosphere form what is known as the climate system. Climate change is a significant change in the climate system lasting for an extended period. Climate change may be due to natural process like sun's radiations, volcanoes, internal variations due to exchange of energy, water and carbon between atmosphere, oceans, land surfaces etc. or it may be human induced like changes in the composition of atmosphere and land use due to human activities resulting in concentration of carbon-di-oxide and other greenhouse gases in the atmosphere thereby increasing temperature. The Inter-governmental Panel on Climate Change (IPCC) has defined Climate change, “as any change in climate over time, whether due to natural variability or as a result of human activity.”<sup>3</sup>

Climate change is an urgent issue to be addressed across the globe. The catastrophic disasters caused by climate change can be seen across the world today. Increased emissions due to burning of fossil fuels and changing pattern of land use have resulted in increased quantities of greenhouse gases in earth's atmosphere. The rise in these greenhouse gases like carbon dioxide, methane, nitrogen dioxide have caused a rise in the amount of heat in the earth's atmosphere as they create a shield around earth and trap the sun's heat which normally would be radiated back to space and the result is increased heat which leads to greenhouse effect, further resulting in climate change. The main characteristics of climate change are – increase in average global temperature, changes in cloud cover and precipitation particularly over land, melting of ice caps and glaciers and reduced snow cover and increase in ocean temperatures and ocean salinity due to seawater absorbing heat and carbon dioxide from the atmosphere.

## **3. CONCERN FOR SOUTH ASIA**

South Asia has a very diverse climate. Half of the climate zones that exist on Earth can be found in South Asia - the highland zone, lower elevations, humid subtropical zone, semi-arid zone, desert zone and tropical wet zone.<sup>4</sup> Such diversified climatic zones make the region prone to a wide range of climate change impacts like glacial melt, forest fires, rising sea levels, mountain and coastal soil erosion, and saline water intrusion.<sup>2</sup> In one of the articles published by Fortune India, it rightly states that, “not war, climate change might devastate South Asia. For a long time security was understood based on military terms and in the aftermath of the cold

war, security is far more contested idea with multiple sources of threats which includes climate change and environmental security also. Environmental security by its very nature is transnational in context; hence these threats are likely to affect both the national and human security.<sup>5</sup>

According to the Fourth Assessment Report of the Inter-governmental Panel on Climate Change (IPCC) published in 2007, highlights that the climate change would bring about the following challenges to South Asia -

- Melting of glaciers in the Himalayas would increase flooding and this in turn would affect long-term water resources and its availability in South Asia.
- Climate change would compound pressure on natural resources and the environment owing to rapid urbanization, industrialization and economic development.
- Crop yields in South Asia would likely decrease up to 30 per cent by the middle of the twenty first century.
- Periodic floods and droughts would impact on the health of the population.
- The rising sea level would exacerbate inundation, storm surge, soil erosion and other coastal hazards.<sup>6</sup>

#### 4. IMPACT OF CLIMATE CHANGE ON SOUTH ASIAN NATIONS

All the South Asian countries are disaster prone. The adverse effects of climate change have increased the frequency and intensity of natural disasters like floods, cyclones and droughts in South Asia. Afghanistan, India, Pakistan and parts of Nepal and Sri Lanka are drought prone areas. Bangladesh, India, Nepal and Sri Lanka are regularly affected by floods. Bangladesh, India and Sri Lanka are prone to cyclones. Landslides are common in the mountainous regions of India, Pakistan, Nepal, Bhutan and Sri Lanka. Maldives, Bangladesh and Sri Lanka are subject to coastal erosion and salinity intrusion. Almost the whole of South Asia is affected by changes in monsoon.<sup>7</sup> These risks and many more are expected to be worsened by Climate change. The Table 1 summarises the types of risks confronting each of the eight countries of the region.

**Table 1:** Summary of Potential climate risks from different sources country wise in South Asia

<b>Countries</b>	<b>Afghanistan</b>	<b>Bangladesh</b>	<b>Bhutan</b>	<b>India</b>	<b>Maldives</b>	<b>Nepal</b>	<b>Pakistan</b>	<b>Sri Lanka</b>
<b>Risks</b>								
Sea Level Rise	No	Yes	No	Yes	Yes	No	Yes	Yes
Glacier Retreat	Yes	Yes	Yes	Yes	No	Yes	Yes	No
Increase in Intensity of Floods	Not so far	Yes	Yes	Yes	Yes	Yes	Yes	Not so far
Increase in intensity of droughts	Yes	In some parts	No	Yes	No	No	Yes	No
Temperature Rise	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

**Source:** Intergovernmental Panel on Climate Change, Assessment Report 4

#### *4.1 Impact on Agriculture*

Agriculture is the backbone of the countries of South Asia. It is the largest source of employment. Since it is mainly dependent on monsoon, failure of monsoon severely affects the poor people of the region whose sole source of income is agriculture and related activities. It creates a situation of food insecurity in the region. Changes in the intensity of rainfall and monsoon cycles, the risk of rising temperatures could significantly affect the crop yields. The overall crop yields are expected to decrease up to 30% in the mid of the 21<sup>st</sup> century. Severe negative impacts are expected in the arid zones and flood affected areas. Further irrigation demand for agriculture is going to increase by 10% for every 1% rise in temperature.<sup>8</sup> While rising temperature directly impacts on crop yields; water availability, changes in soil moisture content, pest and disease incidence etc. affects indirectly.

#### *4.2 Impact on Water*

Water availability in South Asia is dependent on monsoon. Water supply relies on the annual rainfall, 75% of which occurs during the monsoon months, but water availability is expected to decrease significantly especially in the dry season. The supply is threatened by rising temperatures, changes in river systems and coastal flooding.<sup>9</sup> Glacier melts in Himalayas, a major impact of climate change increase the incidence of flooding, aggravating the water resources which affect seriously the conditions of poor rural people dependent on them. The melt water from Himalayan glaciers plays a key role in the provision of water to the region and snowfields currently supplies up to 85% of water demand during dry season, however if climate change and glacial retreat are realised there is a threat that it could be reduced to about 30% of its current contribution over the next 50 years.<sup>10</sup>

Furthermore, changes in temperature and precipitation patterns may result in increased decline of glaciers and high risk from glacial lake outburst floods. A reduction in flow of snow-fed rivers, accompanied by increases in peak flows and sediment yields, would have major impacts on hydropower generation, urban water supply, and agriculture.<sup>11</sup>

#### *4.3 Impact on coastal systems*

Climate change has significant impact on coastal and marine resources in South Asia. Ocean circulation, coral reef ecosystems, ocean and estuarine salinity, fisheries and recreation and tourism activities are severely affected. Coral reefs and mangrove ecosystems, along with being tourist attractions, protect coastal areas against erosion and floods. Climate change will affect these ecosystems through changes in hydrology, sea level, sea temperature and water chemistry. Coral coverage in the Indian Ocean islands and the South Asia combined has declined from more than 40% in 1997 to just over 20% in 2002,<sup>12</sup> which is adversely affecting fisheries, mangrove ecosystem and tourism revenue.

Apart from these impacts, social and economic impacts can be seen in major cities, ports, and tourist resorts; commercial and small scale fisheries; coastal agriculture; and infrastructure development. It is also expected that several millions of poor people could be displaced from the

region's coastal zone in the event of a 1m rise in sea level<sup>11</sup>, further burdening the state's exchequer to meet huge expenditure costs to undertake response measures.

#### *4.4 Impact on Biodiversity and ecosystem*

South Asia is blessed with a very rich biodiversity. The regions ecosystems occupy about 3.6% of the world's area but contain 16% of floral and 12% of faunal species found in the world. However, 10-20% of the region's faunal species are currently under threat of extinction. Forests account for about 20-30% of the total land area of India, Nepal and Sri Lanka and about 68% in Bhutan.<sup>13</sup> Climate change has threatened this rich biodiversity and ecosystem of not only South Asia but the whole world. According to the IPCC, climate change will put some 20% to 30% of species globally at increasing high risk of extinction possibly by 2100.<sup>14</sup>

Climate change and biodiversity are closely linked and each impacts the other. A healthy biodiversity acts as a natural barrier in case of any climate extremes. But, human activities have threatened the rich biodiversity by interfering in the natural habitats and ecosystems resulting in the risk of extinction of thousands of species. Human pressures together with changing hydrology are having discernible impact on the productivity and resilience of South Asia's ecosystems. The Terrai grasslands, Himalayan forests, the Western Ghats and the Sundarbans wetlands are among some of the most significant sites that are threatened. The mountain ecosystems are the one affected most. Climate Change will affect the vegetation, productivity and biodiversity of these ecosystems

#### *4.5 Impact on Human Health*

The extreme weather conditions are sure to have adverse impact on human health. Changes in the severity and frequency of extreme heat and cold and of floods and droughts, coupled with air pollution and others may result in changes in infectious disease occurrence, spreading of insect borne diseases, increasing respiratory sickness. Many of the major vectors for diseases such as cholera, diarrhoea, malaria and dengue are highly climate sensitive and could become more pervasive with rising temperatures.<sup>15</sup> Further climate change has an indirect effect on human health due to declining farm yields and food availability that could lead to malnutrition leading to impaired child development and a heightened susceptibility to other diseases. There will also be health consequences of population displacement and economic disruption. The world Health Organisation believes that even the modest increase in average temperature that have occurred since the 1970s are responsible for at least 1,50,000 extra deaths a year – a figure that will double by 2030, according to WHO's conservative estimate.<sup>16</sup>

## **5. REGIONAL INITIATIVES TO COMBAT CLIMATE CHANGE**

Among the various disasters experienced in the region, the climate related disasters account to around two-third. In the recent times there has also been a rise in the frequency and intensity of these disasters. In the coming years climate change could make way to new and more severe risks in the region. With the rising urgency to respond to its effects, climate change has become a core issue for South Asian nations.

### *5.1 SAARC Level Initiatives*

The impact of climate change knows no boundaries in order to address such issues cooperative efforts are needed. As a result SAARC highlighted the need to strengthen regional cooperation to preserve, protect and manage the diverse eco-systems of the region and also address the challenges posed by climate change and natural disasters. SAARC has taken several initiatives related to climate change. Since 1987, SAARC at its successive summits have discussed the need to address the challenge posed by climate change. At the Third SAARC summit at Kathmandu 1987, a study was initiated on the “Protection and Preservation of the Environment and the Causes and Consequences of Natural Disasters”. Another regional study, “Greenhouse effect and its impact on the region” was initiated at the Fourth SAARC summit at Islamabad 1988. And for implementing the recommendations made by the two regional studies, a Technical Committee was established in the same year with the responsibility of identifying measures for immediate actions.<sup>17</sup> These two studies gave an elaborate picture of the condition of the environment in the Member States of SAARC.

Some noteworthy initiatives taken by SAARC in the areas of environment, climate change and natural disasters are mentioned here which have highlighted the importance of adaptation as a crucial area of concern.

#### *5.1.1 SAARC Environment Action Plan 1997*

The “SAARC Environment Action Plan” was adopted in the Third Meeting of the SAARC Environment Ministers held at Male, October 1997. Some of the key concerns of Member States were identified and laid down the parameters for regional cooperation. Since its adoption in 1997, it has been suggesting measures a number of which have been implemented by the Regional Centres.<sup>18</sup>

#### *5.1.2 Dhaka Declaration on Climate Change 2008*

The SAARC Ministerial Declaration on Climate Change adopted principles for global negotiations on climate change depending on - equity; common but differentiated responsibilities and respective capabilities as enshrined in the UNFCCC and negotiations to be conducted in open, transparent and inclusive manner. It recognised that South Asian region is most vulnerable to climate change having severe impact on agricultural production, vital infrastructures, natural resources and it’s limiting the development options of the future. The Ministerial meeting held that SAARC is committed to promote programmes for mitigation and adaptation. Some of the objectives are–

- Sharing of the results of best practices on research and development on adaptation measures
- Increasing south-south cooperation on technology development and transfer
- Initiation and implementation of programmes and procedures according to SAARC practice for adaptation.<sup>19</sup>

#### *5.1.3 Comprehensive Framework on Disaster Management 2006-2015*

In consonance to the Male Declaration, a “Comprehensive Framework on Disaster Management 2006-2015” was adopted in 2006 to address the specific needs of disaster risk

reduction and management in South Asia. The Framework coordinates with the Hyogo Framework of Action (2005-2015). The member states are working on formulating their respective National Plans of Action for implementation of the Regional Framework.<sup>20</sup>

#### *5.1.4 SAARC Action Plan on Climate Change 2009-2011*

One of the most vital steps taken by SAARC in respect of climate change is SAARC Action plan on Climate Change adopted in SAARC Ministerial Meeting on Climate Change on July 3, 2008 at Dhaka. It identified seven thematic areas of cooperation namely, adaptation to climate change, climate change mitigation, technology transfer, finance & investment, education & awareness, management of impacts & risks as a result of climate change, and capacity building for international negotiation. Implementation shall be the responsibility of the national governments in cooperation with other SAARC member nations. The Action plan listed the objectives as -

- To identify and create opportunities for regional and south-south cooperation for transfer of technology and knowledge
- Regional level action plan on climate change through national level activities.
- To support the global negotiation process of the UNFCCC<sup>21</sup>

#### *5.1.5 Thimphu Statement on Climate Change 2010*

The Sixteenth SAARC Summit Thimphu 2010 was dedicated to the theme of Climate Change. The Summit declaration was termed 'Towards a Green and Happy South Asia'. Additionally, there was an agreement to establish an Inter-governmental Expert Group on Climate Change which shall meet at least twice a year. Then, the Eight Heads of State adopted the 'Thimphu Statement on Climate Change', and discussed ways to jointly fight climate change, some of which are -

- Encourage the use of green technology and best practices
- Promote better understanding of the science and adverse effects of climate change through education
- Planting ten million trees in next five years (2010-2015) as part of a regional afforestation and reforestation campaign
- Conservation of bio-diversity and natural resources
- Conservation of aquatic eco system
- Focus on water management and conservation
- Commission a SAARC Inter-governmental Mountain Initiative SAARC Inter-governmental Monsoon Initiative SAARC Inter-governmental Climate-related Disasters Initiative.<sup>22</sup>

#### *5.1.6 SAARC Convention on Cooperation on Environment 2010*

During the 16<sup>th</sup> SAARC summit, the "SAARC Convention on Cooperation on Environment" was signed and it was approved by all Member States and came into force on 23 October 2013. The Convention ascertains 19 areas for cooperation in the field of environment and sustainable development through exchange of best practices and knowledge, capacity building and transfer of eco-friendly technology in the areas related to the environment.<sup>23</sup>

### 5.1.7 SAARC Agreement on Rapid Response to Natural Disasters 2011

The “SAARC Agreement on Rapid Response to Natural Disasters” was signed at the 17<sup>th</sup> Summit at Addu, Maldives, 2011 and has come into force with effect from 09 September 2016. The setting up and operationalization of the SAARC Natural Disaster Rapid Response Mechanism, aims to establish an effective mechanism for rapid response to disasters to realize substantial reduction in loss of lives and loss of social, economic and environmental assets in times of a disaster.<sup>24</sup>

At the *Eighteenth SAARC summit Kathmandu 2014*, the relevant bodies were directed for effective implementation of SAARC Agreement on Rapid Response to Natural Disasters, SAARC Convention on Cooperation on Environment and Thimphu Statement on Climate Change by considering the threats posed by climate change on SAARC Member States. SAARC’s decision to establish, SAARC Environment and Disaster Management Centre was welcomed.<sup>25</sup>

### 5.1.8 SAARC Regional Centres

Four Regional centres were formed to discourse on the various aspects of the environment, climate change and natural disasters and organize a framework of SAARC institutions to address climate related risks in the region. They were –

1. *SAARC Disaster Management Centre (SDMC)*, established in New Delhi with the objective to focus on establishing and strengthening the regional disaster management system.
2. *SAARC Meteorological Research Centre (SMRC)*, Dhaka, objective was to provide a regional basis for weather forecasting and monitoring.
3. *SAARC Forestry Centre (SFC)*, Bhutan was to conduct research into mountain ecology and developing new methods to manage forest resources
4. *SAARC Coastal Zone Management Centre (SCZMC)* in Maldives was responsible to promote regional cooperation in planning, management and sustainable development of coastal zones, and conduct research, give training and create awareness in the region.<sup>26</sup>

However, since 2016 these four centres have been merged. SAARC Disaster Management Centre (SDMC), India has been reconstituted by merging these centres to play an expanded role. SDMC, Delhi works with the objective to support Member States in Disaster Risk Reduction initiatives through application of Science & Technology, knowledge from multiple disciplines, exchange of best practices, capacity development, collaborative research and networking in accordance with the global priorities and other relevant frameworks adopted by Member States.<sup>27</sup>

## 5.2 National Level Initiatives

SAARC Action Plan on Climate Change aims to provide an impulse for regional level action plan through national level activities. Climate change being a transnational issue and South Asian countries having significant commonalities related to climate change risks, it is being considered as an urgent issue to be addressed at national level as well. We can find many areas of cooperation in national level activities that could provide a foundation for resolute efforts at the regional level. Countries of South Asia have developed their own National



Adaptation Programmes of Action. The table below summarises the initiatives that have been taken at the national level.

**Table 2:** National Climate Change Policies/ Programme of the SAARC Countries

Member States	National Climate Policy/ Programme
Afghanistan	National Capacity Needs Self-Assessment for global environment management 2009
	National Adaptation Programme of Action for Climate Change, 2005
Bangladesh	National Adaptation Programme of Action for Climate Change, 2005
	Bangladesh Climate Change Strategy and Action Plan, 2009
Bhutan	National Adaptation Programme of Action for Climate Change, 2006
India	National Action Plan for Climate Change, 2008
	8 Missions have been constituted
	National Solar Mission
	National Mission for Enhanced Energy Efficiency
	National Mission for Sustainable Habitat
	National Water Mission
	National Mission for Sustainability of Himalayan Eco-system
	National Mission for the Green India
	National Mission for Sustainable Agriculture
	National Mission for Strategic Knowledge for Climate Change
Maldives	National Adaptation Programme of Action for Climate Change, 2006
	Strategic National Action Plan that Integrates Disaster Risk Reduction and Climate Change, 2011
Nepal	National Adaptation Programme of Action for Climate Change, 2010
	National Climate Change Policy, 2011
Pakistan	National Climate Change Policy, 2013
Sri Lanka	National Climate Change adaptation strategy for Sri Lanka

**Source:** Bishal Thapa, Thimpu Statement on Climate Change: A Mere Rhetoric, SAWTEE, 2013, retrieved from: <http://www.sawtee.org/publications/Policy-Brief-28.pdf>

Though a number of declarations and policies to combat climate change at both regional and national levels have been made, many policies are yet to be operational and some still have not been ratified. Though a number of institutions have been formed they are able to produce desired results as expected by the declarations, policies and plans undertaken by SAARC. One such example is the SAARC Food Bank, which was established in 1987 and then reformed in 2004. However, due to lack of reserves, bureaucratic pressures and complicated financial details in terms of pricing and funding have not been able to function properly. Though SAARC is aware of the intensity of the threat of climate change and the necessity to work with a coordinated approach, it has not been able to transform its desire into concrete actions.

The major barriers for an integrated approach of the region are - lack of political and institutional will, lack of proper institutional coordination mechanism, lack of adequate funding or resource mobilisation, vast diversity of the region which makes it difficult to take up a joint approach and above all the 'the trust deficit' between the countries of the region.<sup>19</sup> As a result of all these SAARC is not able to function effectively in combating climate change.

## 6. CONCLUSION

Climate related security risks in South Asia are not only regional but also multidimensional. The risks from the climate change gives rise to not only environmental security threats but also other security threats such as economic, political, military etc. In this regard R.K Pachauri, observed, "The world has all kinds of drivers of stress and drivers of conflict. With the climate change, these are likely to get accentuated further."<sup>28</sup> Thus climate change creates new challenges for national, regional, international security and off course human security. However it is high time, if the member states fail to take concrete action to prevent the devastating impacts of climate change, and make efforts to mitigate and adapt to climate related security risks, than South Asian region will have to face more severe consequences in the coming years. Hence member nations have to unite and make SAARC an efficient organisation to combat climate change and its security risks.

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