

## Chapter 2

# Climate Change and Its Impacts

**Abstract** There are two types of causes which can induce change in the climate of a region, namely, natural and human induced causes. The change in climate due to volcanic activity, changes in solar output or change in the earth's orbit around the sun can be examples of natural causes. The human induced causes include but not limited to burning of fossil fuels and conversion of forest or agricultural lands. As a result of the change in regular pattern of climate both water and energy sector has been severely effected. The effect is dominant on the urban as well as rural environment.

**Keywords** Climate impact • Climate change • Natural resources

The climate change impact on natural resources and energy sources are well documented in many related literatures and reports (Poudyal et al. 2016).

The hydropower plants being water based energy resources has been found to be directly impacted by the change in climatic pattern of the precipitation and temperature (DeNooyer et al. 2016; Gaudard et al. 2016; Koch et al. 2016).

The change in climatic pattern can be attributed to various causes which can be classified under natural and anthropogenic influences.

In short it can be explained that due to the increase in Green House Gases (GHG) like Carbon di-oxide, Methane etc. the atmospheric temperature has also increased as all the gases under this class is an absorbent of heat. The contribution from industrial and agricultural industries along with auto-mobiles the density of GHG gases has increased beyond limit. As an effect the climatic pattern has also changed. Some of the impacts of climate change can be found in Fig. 2.1.

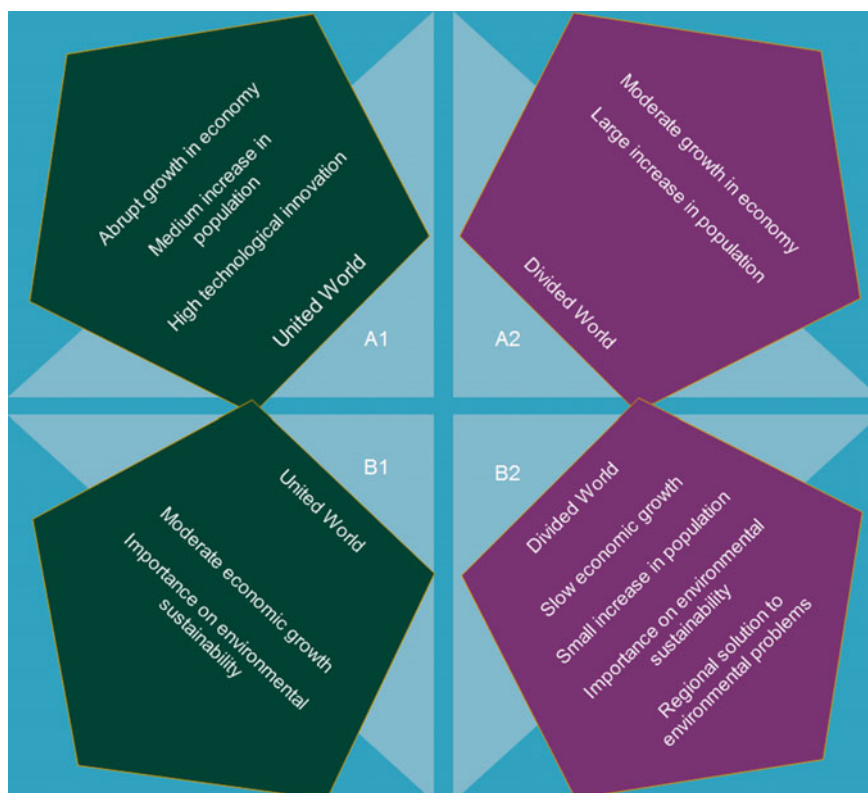
The impact of climate change on energy resources and more importantly water based energy resources has been explained and identified in Iliadis and Gnansounou (2016); Huang et al. (2016), Ludwig et al. (2016), Molden et al. (2016) etc.



**Fig. 2.1** Figure showing the impacts of climate change

The Inter-governmental Panel on Climate Change (IPCC) was established to work about the impact of climate change. The Panel has simulated the future scenario based on the change in climatic pattern, socio-economic stability and increase in urban population.

In total four scenarios were made viz, A1, A2, B1 and B2. In the first two scenarios, world is taken as globally united. But in case of A1 scenario situation more economical than environmental and in B1 scenario the situation is opposite. The only difference between A1 and A2 or B1 and B2 is that in the latter world is regionally divided. Figure 2.2 shows a schematic diagram of the four main scenario and the way it simulates the situation that may or may not exist in the near future.



**Fig. 2.2** Figure showing the four main IPCC scenarios of climate change

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