Chapter 4
Climate Change and Supply Chain Operations

INTRODUCTION

In the previous chapter 3 the focus of the presentation has been on the implications of climate change, as felt globally, for the environment and human societies in developing as well as in developed countries. As noticed there, the Stern Review’s conclusion that “climate change will have increasingly severe impacts on people around the world, with a growing risk of abrupt and large-scale changes at higher temperatures” (Stern Review, 2006) is shared by most scientists and governments. The Review warns that “a warmer world with a more intense water cycle and rising sea levels will influence many key determinants of wealth and well-being, including water supply, food production, human health, availability of land, and the environment” (Stern Review, p. 84).

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The business world, in particular, is faced with serious physical (and, consequently, economic and market) risks, which vary across different sectors. The cause-effect relations between natural phenomena due to climate change and impacts to companies are easy to establish. The impacts of phenomena such as increased droughts and flooding, greater frequency of heat-waves, increased frequency and intensity of hurricanes, cyclones and storms and sea level rise on business activities may differ depending on type of activity, location etc. Thus, such phenomena may damage industrial plants and commercial premises, disrupt operations (e.g. production and transportation), dislocate plants and customers, reduce purchasing power and decrease consumer demand, deplete agriculture resources etc. At a macro level, they may cause conflicts among social groups and nations and political and social instability, with obvious repercussions on business activities.

Figure 1 illustrates the pathways, by which the physical risks of climate change can affect business (Sussman & Freed, 2008, p. 13). This figure, entitled the “Risk Disk”, illustrates three types of risks. Risks to core operations, such as physical plants, are indicated in the innermost circle. Risks to the value chain are listed in the medium ring. The outermost ring displays risks that arise from broader changes in the economy and infrastructure.

Examples of risks to core operations include risks to physical structures and assets of the firm due to weather extremes, affecting asset values and requiring repair, redesign and/or relocation. Also, weather extremes may have impacts on the effectiveness or efficiency of production processes, the cost of operations and maintenance (O&M) activities or the quality of a product.

Regarding the risks to the value chain, climate change may adversely affect the quality or quantity of inputs into production, or the demand for products. Examples include impacts on natural resources, such as agricultural and forestry products, which are affected by water availability or quality, impacts on health and safety of the workforce, work attendance or health care costs, and impacts on demand for cooling in summer months.

Finally, risks to the broader supply and demand network refer to utilities, services, and related infrastructure, which provide support to business operations and production processes, and to supply chains and distribution networks. Related risks include disruption to utilities, especially electricity generation, water supply, and sewerage, which can affect the supply chain. In addition, extreme weather events associated with climate change, such as flooding or high winds, may damage transport infrastructure or slow delivery of inputs and supplies via road, sea or rail. As pointed out in (Sussman & Freed, 2008), a general increase in temperature and a higher frequency of hot summers are likely to result in an increase in buckled rails and rutted roads, which involve substantial disruption and repair costs. During extreme events, such as hurricanes, access disruptions may affect not only the
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