

Survey Results on the Vulnerability of German Baltic Ports due to Climate Change

Survey conductor: Institute for Ecological Economy Research (IÖW)

10 port operators and 28 port-based businesses in the German Baltic Sea region participated in the survey (2012). Most of the ports and businesses (85%) have been affected negatively by storms during the last 15 years (see figure 1). Half of them even claimed medium to severe damages or disruptions. When asked how the number of damages and disruptions in operation due to extreme weather events has developed in the last 15 years, 64% answered that the number has been unchanged. However, 32% of participants stated that this number has increased.

Especially the increase in storm intensity, heavy rainfall events, high storm water levels, and in winter precipitation have negatively impacted up to 86% of the ports and businesses. Nearly half of the ports and businesses expect stricter insurance requirements, rising insurance premiums, and more disruptions in operation. A large percentage of participants viewed a reduction in gross value due to climate change as a risk and viewed rising costs for utilities and protective measures as a considerable risk. One third of participants are concerned with rising expenses for transportation, and damages to buildings, vehicles, and stored goods.

The IPCC currently estimates a rise in sea level of up to 59cm until the year 2100 compared to the year 2000. Assuming a linear increase, the sea level would rise by 30cm until 2050 (see the vertical scales in figure 2). Accordingly, at least one of the ten participating ports will have to implement adaptation measures by 2050. However, the rise in global sea level has been measured far above the IPCC's estimates. Recent studies conclude a more pronounced sea level rise until 2050 (see figure 2), which would force half of the surveyed ports to adapt actively before 2050.

Also, storm related high tides pose a risk to German Baltic Sea ports. For three out of ten ports, high tides during storm with a peak height of 1.99m above normal may lead to disruptions in operation and damages. During the last century, at three occasions this value was reached in the south-western Baltic Sea (see figure 3). If the high tides of 1904/05 and 1954 with peak values of 2.22m and 2.18m reoccur, 7 out of 10 ports expect severe disruptions and damages. A high water level with a peak value of 3.43m, as it occurred in 1872, will most certainly have severe consequences for all surveyed ports.

Weather related operational disruptions could affect especially port-affiliated businesses, which depend on a reliable and steady supply and delivery. If a disruption continues for one day or even seven days, respectively 22% and 89% of businesses may not be (fully) operational.

In contrast, global warming could in some respects provide also positive opportunities – most prominent could be the reduction in cost for winter services (70%), and in heating cost (48%), as well as improved port accessibility due to a reduction of sea ice (42%). However, it has to be noted that current research identified also scenarios as possible that could mean harsher winters in central Europe with more snow and more frequent periods of extreme cold. Should the latter be the case, the mentioned opportunities for ports and businesses will turn into risks as well.

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Figure 1: Disruptions in operation and damages caused by extreme weather events during the last 15 years

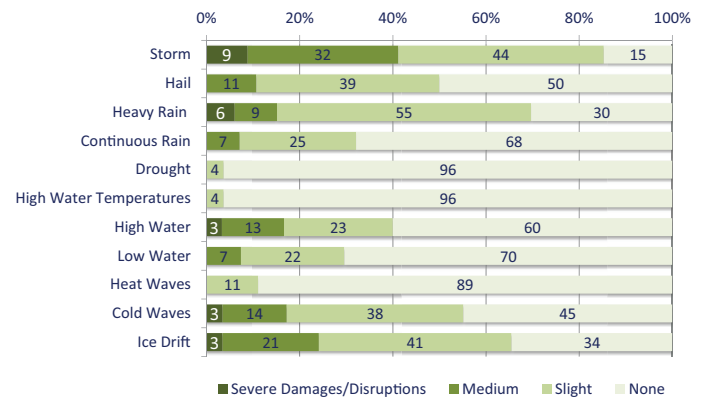


Figure 2: Critical amount of sea level rise for German Baltic Sea ports

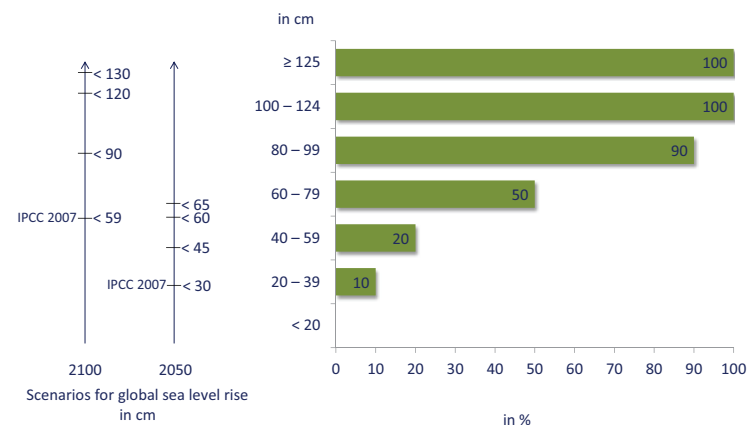


Figure 3: Critical amount of high water level for German Baltic sea ports

