

1 Introduction

1.1 Vulnerability of water management and flood protection systems

Water is life and your friend (when it behaves itself). That is an adage as old as humanity. The hanging gardens of Babylon and the rich granaries of ancient Egypt could only be made possible with ingenious water systems that regulated the water level of the rivers, and provided the surrounding lands with water.

There was, and is, a downside to all that water. The people in low-lying areas were time and time again confronted with floods. And when they started building levees, the structures frequently did not stand up to the natural violence of storm surges, hurricanes, and in the worst case, tsunamis. The people living on higher grounds for their part were regularly confronted with overflowing rivers due to melting glaciers and excessive rainfall.

Apart from natural threats, there are also human threats related to water. From ancient times on, water was a good defense against enemy threats. Fishing villages built on poles could easily defend themselves. Castles and cities alike built moats and extensive canal systems that could serve both for transporting goods and as a defensive against aggressors.

Over time, water management and flood defense systems such as levees, sluices, and harbors have grown bigger and more complicated, just as our society has grown bigger and more complex. Hundreds of millions of people live in river deltas lying below sea level, in cities that sink extra as a result of excessive use of fresh groundwater.

Levees and freshwater supplies are important to many and are therefore becoming more and more vulnerable to people with malicious intent. It is therefore not only mandatory to pay attention to the safety of such critical infrastructures but also to their security.

1.2 What is this book about?

In this book we look at safety-related vulnerabilities of flood defenses in general, and levees, sluices, weirs, and navigation locks in particular. The book itself is about how to develop security risk scenarios. We want to link safety and security risk analysis, with flood defenses as an example. Attackers or perpetrators (we use the two terms together, depending on the nature of the security threat we are discussing) often use weaknesses in technical designs to let them malfunction or even destroy them. Safety shortcomings and safety hazards are a “good” indication of weaknesses that can be taken advantage of by perpetrators.