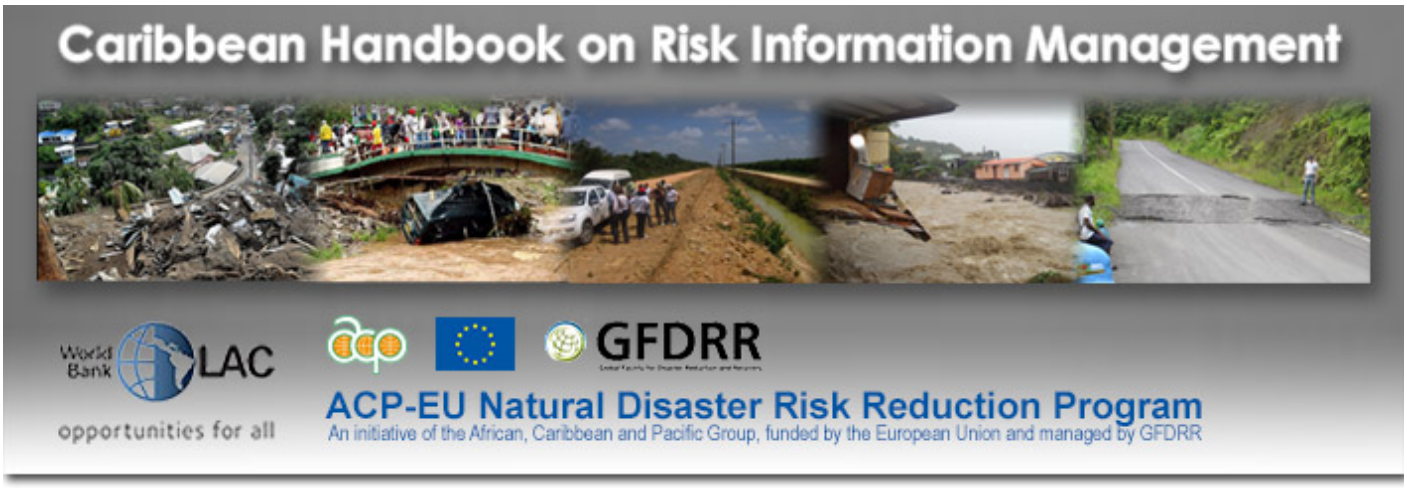

3.1 Introduction to Flood hazard assessment

What are Flash Floods?

A flash flood is a rapid flooding of geomorphic low-lying areas: flood plains, river valleys, coastal plains. It may be caused by heavy rain associated with a severe thunderstorm, hurricane, tropical storm, or meltwater from ice or snow flowing over ice sheets or snowfields. Flash floods usually come from an overflowing river, but people also can experience flood like conditions directly from rainfall because of poor surface drainage. Flash floods may occur after the collapse of a natural ice or debris dam, or a human structure such as a man-made dam. Floods occur simply when a river channel is not large enough to contain the discharge. There may be many reasons for this: the river channel can have large amounts of sediment, in between large discharges vegetation may have grown in the channel decreasing its capacity, or blockages by stones and boulders. Also man made structures such as bridges and culverts may not be designed for rare large discharges, and the added obstruction causes flooding in front of it. As a rule of thumb, flash floods are distinguished from regular floods by a timescale of less than six hours.

Flood hazard assessment

The definition of a hazard of the UN-ISDR is: “A dangerous phenomenon, substance, human activity or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage. This event has a probability of occurrence within a specified period of time and within a given area, and has a given intensity.” (see section 2.1)

Based on this definition, determining flood hazard is a combination of the following steps:

1. Determine the flood characteristics for a given event, which can be extent only, or a combination of extent and depth, or even a combination of extent, depth and flow velocity. The available information on the characteristics of a flood depend on the method used. The information needed depends on the hazard interpretation (evacuation, building damage, early warning etc.). So in fact the first decision before embarking on a flood hazard assessment must be: *what is the ultimate goal?*
   If the goal is to have a large scale national flood hazard assessment to see which areas (townships) are affected, the flood extent is enough. This can be useful for national planning.
   If the goal is to calculate building damage and damage to infrastructure, flood depth must be included, because many building damage assessments compare building structure and material to water depth. The scale for this analysis is more detailed, where individual buildings can be recognized.
   If the goal is to secure people and assist evacuation, the hazard map must include depth and velocity, because the combination of the to determine if one can pass on foot, with a vehicle etc. Also flood

timing is important in such a case. The scale for this analysis is also detailed, to plan evacuation routes and identify shelters.

2. Determine the probability of occurrence of each flood, so that the flood characteristics can be linked to a recurrence interval. Some methods are not able to do this, in which case the analysis becomes a flood susceptibility analysis, rather than a hazard analysis.
3. Translate flood characteristics into a hazard. The hazard level is an interpretation of flood information, and depends on the type of hazard information needed, the degree of exposure and the type of elements at risk. It is valid for a given context: for example, a water depth of 50 cm may be very damaging in a shopping mall, but harmless for a house built on stilts. Of for instance a depth and velocity can be interpreted towards hazard classes related to evacuation, while the hazard for potential building damage is different.

A hazard map is not a risk map, a risk analysis includes the potential impact of one or more hazards, taking into account the vulnerability and resilience of the elements at risk. For instance the flood hazard map does not include information on potential damage to buildings for instance.
