

FLOODING

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"Humanitarian Implications of Climate Change: Mapping Emerging Trends and Risk Hotspots" Copyright © 2009 CARE International. Used by Permission.



Flooding – an overflow of a large amount of water beyond its normal confines – can take many forms.

River flooding is usually the result of heavy and/or widespread rainfall, or sometimes melting snow. But blockages such as fallen trees, overgrowth or rubbish can increase the risk of river flooding.

Coastal flooding is often due to extreme weather such as storms, tropical cyclones and/or high tides. Tidal surges can also flood estuarine areas, which are also at risk from high river flows upstream.

Groundwater flooding occurs when the water level under the ground exceeds normal levels and reaches the surface – usually after prolonged rainfall. The permeability of the local geology is the major control.

Inadequate drainage systems can result in **urban flooding**, if rainwater is unable to drain to ponds, rivers or sewerage systems.

Flash floods can be caused by heavy rainfall, or catastrophic events such as the collapse of dams, landslides, earthquakes or volcanoes. Areas with steep slopes, heavy rain, a massive melting of snow, or the failure of flood or drainage systems can lead to the sudden release of water that quickly becomes very deep. This can carry away people, bridges, etc.

Climate change and flooding

Although there has always been flooding, evidence suggests a correlation between global climate change and flooding. Because warmer air can hold more water, rainfall events are likely to be stronger. Rainfall volume is likely to increase by 1-2% per degree of warming, and rising sea levels put more coastal areas at risk. In addition, changes in atmospheric circulation are likely to cause more extreme weather events, which are often difficult to predict.

DID YOU KNOW?

'Deluge myths' are widespread in many cultures. Some scientists believe there may be a historical basis for the bible's story of Noah's Ark, with a catastrophic rise in the level of the Black Sea at around 5600 BC. As well as Noah's Ark, other deluge myths have their origins in the Black Sea area, which may stem from the same event. Scientists are undecided as to whether the flood would have been large enough to have such an influence on culture.

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Significant UK floods

Date	Major features
2012	The insurance industry paid claims totaling over £1.19 billion when a series of low pressure systems brought heavy rain to most of the UK from April right into the winter. Freak weather included destructive thunderstorms and severe hailstones in the Midlands in June; river floods, flash floods and groundwater flooding due to saturated ground; and landslides that led to major rail disruption.
May – July 2007	The wettest May – July for 250 years led to extensive flooding over England and Wales, with Yorkshire worst hit. More than 55,000 homes and businesses were affected.
August 2004	A flash flood, triggered by heavy rain over 8 hours, affected Boscastle and Crackington Haven in Cornwall.
15 August 1952	The greatest loss of life from a UK flood in living memory, when a flash flood killed 34 people in Lynmouth, Devon. A 9m high wall of water swept down narrow valleys into the town.

DID YOU KNOW?

Following the North Sea floods of 1953, which killed over 18,000 people in the Netherlands, the Dutch Regional Water Authorities have developed some of the best flood defences in the world. The aim is to safeguard vulnerable areas from a 1 in 10,000 year event through a network of sluices, locks and barriers. Other measures include river widening and building floating homes.

Flooding in the UK

Floods are a significant natural hazard in the UK. According to the Environment Agency, the UK average for homes at risk of surface water, river and tidal flooding in 2013 is one in six.

Global flooding

Flooding accounts for about 40% of all national disasters. According to a 2012 report, in the previous 18 months, destructive floods had occurred in Pakistan, Australia, Brazil, Japan, the Philippines, S Africa, Sri Lanka, Thailand and the USA. Almost the entire population of Bangladesh lives in a flood-prone area, and most of Holland is also at risk.

With a growing urban population, urban flooding is an increasing problem, particularly in unplanned developments. Rio de Janeiro hit the headlines several times in 2010/11 as heavy rains triggered floods and mudslides that, in the January 2011 event alone, killed over 800 people. There is a debate about the role of climate change, but no doubt that poor urban planning was also to blame.

Flood prediction?

It is often possible to predict flooding using weather forecasting and information about local geology.

In flood plains, geoscientists use technology such as satellite imaging and remote sensing to monitor alluvial deposits and produce risk maps.

In extreme circumstances, flood warnings will be followed by evacuation.

Oosterscheldekering sea wall, the Netherlands



Flood defences

In **floodplains**, soft measures include changing farming practice, tree planting, or encouraging a 'managed retreat' of the flood plain to its natural environment.

Where needed, engineering can raise the natural flood banks to form 'levees', or reroute the main channel.

Dams can help regulate flow and reduce downstream risk. At river mouths, flood barriers such as the Thames Barrier can protect upstream areas.

In **coastal areas**, natural defences such as mangroves and wetlands can help with flood defence.

Engineering approaches such as seawalls and levees can protect seafronts, whilst groynes, breakwaters and artificial headlands encourage sediment deposition on the beach and give protection from storm waves.