

IMPROVING THE REGULATORY FRAMEWORK OF FLOODPLAIN MANAGEMENT AND DEVELOPMENT IN THE UNITED KINGDOM

B.Alam¹ and C.Pathirage²

¹ *School of the Built Environment, University of Salford, 43 Crescent, M5 4WT, United Kingdom*

² *School of the Built Environment, University of Salford, 43 Crescent, M5 4WT, United Kingdom*

Email: B.Alam@edu.salford.ac.uk

Abstract: Flooding is a natural disaster that most commonly impacts the United Kingdom. The frequency of flooding makes it an important focus for a researcher. The scope of flooding is wide-ranging as it can affect people, society and the economy. A particular location vulnerable are the floodplains as these are naturally prone to flooding. Such developments suffer from varying degrees of risk during times of flooding. In the United Kingdom, floodplain developments have risen leading to added risk to occupants. Property owners are thus exposed to risk with flood regulation coming into effect through planning, defences, insurance and taking precautionary measures. A deep understanding of flood response and management will be needed for this research. For this project, each stage of the regulatory process involving flooding and floodplains in the United Kingdom will be examined to provide an overview of current flood management practice. Current findings show that there are regulatory gaps with regards to flood resilience in relation to aspects such as flood insurance and though a unified strategy exists there is a disconnect with flood response. An extensive literature review will be used to showcase the challenges and barriers to flood response on the floodplains. This is with the aim of better improving the existing regulatory framework of floodplain management in the United Kingdom.

Keywords: Disaster Management, Flooding, Floodplain, Floodplain Development

1. INTRODUCTION

Flooding is a natural disaster that is ranked as the most common the affect the world. It is held as the worst threat to the UK with the danger posed by it set to increase in the future (Defra, 2015). Their frequency makes it an important focus for research. Guha-Sapir et al. (2010) noted floods being the most common natural disaster worldwide. Thus, their effect is wide ranging and communities are more likely to be affected by it. Floodplains are particularly vulnerable as they are ecologically connected to a body of water making them naturally prone to flooding. In England, rivers and coastal floodplains have been populated for centuries with floodplains making 12% of the country and 8% of those having property developments (CCC, 2012). Flooding also impacts infrastructure such as energy, water and communications (EA, 2009). Thus, damages to affected regions can be extensive with floodplains being particularly vulnerable. The Environment Agency (2015) states that floodplains, “*would naturally be affected by flooding if a river rises above its banks, or high tides and stormy seas cause flooding in coastal areas*”. In 2009, an estimated 2.4 million properties were already situated in a floodplain (NAO, 2014). The damage can include disruption in the community, damage to structures and the loss of human lives.

For methodology, an exploratory based research has been used to highlight improvements to the existing framework with qualitative methods being utilised through the use of an extensive literature review.

2. FLOODING

Flooding is a natural hazard that can come from a variety of sources including river or ground water. The United Nations stated, “*flooding can arise from overflowing river, heavy rainfall over the short period or an unusual inflow of sea water onto land, such as storm surge, tidal flooding, seismic events (tsunami) or large landslide*” (Proverbs and Mambretti, 2012; pg. 156). Floods impact human life with them being a growing risk to populations, particularly those in floodplain areas. It has the greatest potential for damage among the natural disasters and affects large numbers of people (UN, 2004). The dangers posed by it are widespread with it capable of devastating entire communities. Fleming (2002; pg. 15) stated, “*floods are a natural occurrence and the risk they pose is wide ranging. However, for society, the main focus is the risk to people and property.*” Thus, floodwaters can destroy both residential and commercial properties. It also affects; transportation, communication, agricultural developments and damages the environment. In addition, the after effects can lead to health risks from pollution and water-borne diseases (Marriott et al, 1999). The frequency of flooding makes it the most common of the natural disasters with its effects illustrated in **Figure 25**.

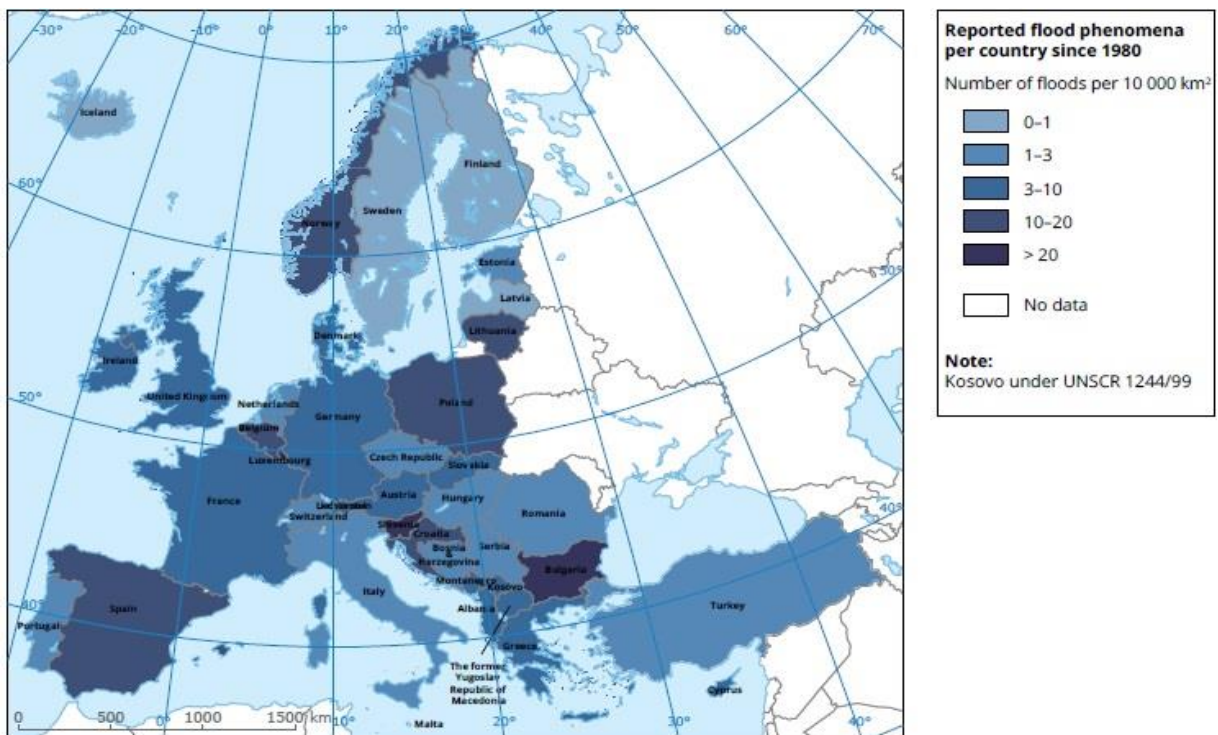


Figure 25: Reported Flood Phenomena (number of floods per 10,000 km), per country (since 1980) (Source: EEA, 2015)

A Climate Change Committee (2012) report noted that flood damage is expected to increase across the UK in the future. Flood damage amounts to £1.1 billion per year in costs in England (Bennett and Hartwell-Naguib, 2014). In 2000, 10,000 properties in England and Wales suffered from flooding and weather-related insurance claims totally to around £1 billion (POST, 2001). There are an estimated 5.8 million (nearly 20%) of properties that suffer from the risk of flooding in the UK (Defra, 2013). As such, the effects of flooding are wide-ranging in the UK. Research has indicated that the effects of flooding may be more extreme than previously estimated when taking into account the potential increases in rainfall

volume and intensity and risk of extreme sea level rise (Evans et al., 2008). Thus, the danger posed by flood risk is only set to increase in the future.

2.1 Floodplains

An area prone to flooding are regions known as floodplains. These are, “*the land next to, or hydraulically or ecologically connected to, the flowing river*” (Freitag, 2009; pg. 44). These areas are naturally prone to flooding and therefore suffer from a higher degree of flood risk. However, Freitag (2009) noted human developments on floodplains can bring about a quick and deadly response from the river. Such areas are subject to urban development but suffer from extreme floods making them contested regions. Annually, extreme floods create enormous and mounting damage on floodplains (Hartmann, 2011). The IPCC (2007) noted human development on floodplains and inadequate flood response plans have led to greater potential for damage caused by flooding. Despite the dangers, there have been developments in floodplain areas (Hartmann, 2011). This is due to factors such as growing population pressures and the land being viable for development. Floodplains are among the most densely populated areas in the world with these being particularly well suited for development (Kron, 2005). However, environmental changes alongside wider societal changes can potentially alter the likelihood of human exposure to hazards and the susceptibility of people to their impacts (Few, 2007).

In England and Wales, there were approximately 1.85 million homes, 185,000 commercial properties, around 5 million people and half of agricultural land suffering flood risk (Few, 2013). In 2009, the Environment Agency (EA) noted that 2.4 million properties were situated on the floodplains in the UK (EA, 2009). A CCC (2012) report stated that floodplain development grew faster in England over the past ten years. Many developments were deemed protected but one-in-five suffered from significant flood risk. It is for this reason a framework is necessary to better manage new developments in floodplain regions and prevent inappropriate constructions. These developments expose inhabitants to the danger of flood risk as floodplains are more vulnerable to hazards. During floods, such areas can experience disruption in the community, damage to property and possible loss of life. However, due to their nature, floodplains serve as sites that are subject to development.

2.2 Floodplain Developments

Floodplain developments hold many advantages but unrestrained development is noted for being costly and dangerous (Owen, 1981). Marriott (1999) noted that many of the worlds densely populated areas resided on floodplains. Such sites face an ever-present danger as they are prone to flooding. In 2004, a consultation with the Association of British Insurers (ABI) stated a need for stronger and more transparent planning systems to curtail developments on floodplains (ABI, 2004). It recommended the EA be made a statutory consultee on all planning applications in flood areas. However, there have been a number of developments on floodplains. The CCC (2012) noted floodplain development had grown at a fast rate compared to the past ten years. Whilst 80% of floodplain development were in well-protected locations, one-in-five properties built in such areas suffered from significant flood risk (CCC, 2012). On the approval process, the report stated that it was ‘*not sufficiently transparent or accountable*’. Furthermore, the EA stated that they only knew the outcome of 65% of planning applications that they objected.

The CCC (2012) report also were concerned on whether local authorities considered alternative developments before agreeing to construction on floodplains and whether long-term effects of climate change with regards to flooding had been considered. In 2013, local councils allowed 87 planning developments that saw 560 homes built in areas of high flood risk in England and Wales (RIBA, 2014). In 2009, an estimated 2.4 million properties were already situated in a floodplain (EA, 2009). Floodplain development had grown at a fast rate compared to the past ten years with one-in-five properties built in such areas that suffered from a significant flood risk (CCC, 2012). The number of homes stated to be built in flood risk had risen by a third in 2013 as compared to the previous year (RIBA, 2014). Despite the risks, such developments are only increasing and exposing their occupants to danger from flooding. The CCC (2014) noted that continued floodplain development leads to an increasing reliance on the use of flood defences. As such, the regulation of floodplain developments can reduce the burden placed on flood defences through the use of an effective flood risk management system that seeks to avoid inappropriate construction in these areas.

3. REGULATORY FRAMEWORK

Parliament, regulatory authorities and courts have recognised the dangers of flooding and have attempted to address this through regulatory frameworks. To combat these risks, efforts are made in order to mitigate their impact. Such mitigation takes the form of disaster management that seeks to either avoid or reduce the potential losses from the hazard. To mitigate their impact, disaster management aims to either avoid, adapt or control the hazards effect. Wisner (2003) stated that disasters are a, "*complex mix of natural hazards and human action*". The UNISDR noted that disaster risk is composed of multiple factors that include the occurrence of an extreme hazard event caused by natural forces/natural forces alongside human interference and that this affects something or someone (Holt, 2012).

The approach adopted by the courts established in the case of *Arscott v. The Coal Authority* (2004) referred to flooding as a '*common enemy*' that needs to be prevented. This involves taking steps to reduce likelihood of flooding and mitigate its impact. The strategic overview and management of flooding lay with set regulatory bodies such as the EA (Defra, 2014). Legislation such as the Flood and Water Management Act (2010) provides the framework for flood management. Ultimately, flooding cannot be avoided though the general approach is to manage the risk (Schanze, Zeman and Marsalek, 2006). In the UK, the EA operates as the statutory consultee on all new developments within floodplains (RIBA, 2009). It offers guidance and operates as part of the regulatory framework in managing the risks in floodplain developments. It is a requirement that Local Authorities consult with the EA during planning applications when a proposed development can suffer from a risk of flooding. Despite these measures, the UK has experienced flooding on numerous occasions as detailed in the following section.

3.1 Flood Regulations

Flood risk is the combination of probability/hazard and consequence/impact (Sene, 2008). Thus, flood risk management operates by mitigating the extent of the flood damage. To combat flooding, regulatory systems are used to create a system to implement and manage flood defences. As a result, through management and organization it seeks to better respond

and cope with hazards/disasters. The tools created as part of this framework include; flood risk assessments, hazard maps, management plans, improved strategic coordination and public participation. This creates an element of flood defence with the goal of protecting human lives and property from flooding events. Developments in the international landscape have also led to incorporation of such frameworks into the UK as highlighted in **Figure 26**. Through law, a system is introduced through which guidance and enforcement is produced to implement such a framework with the aim of mitigating the impact of flooding hazards.

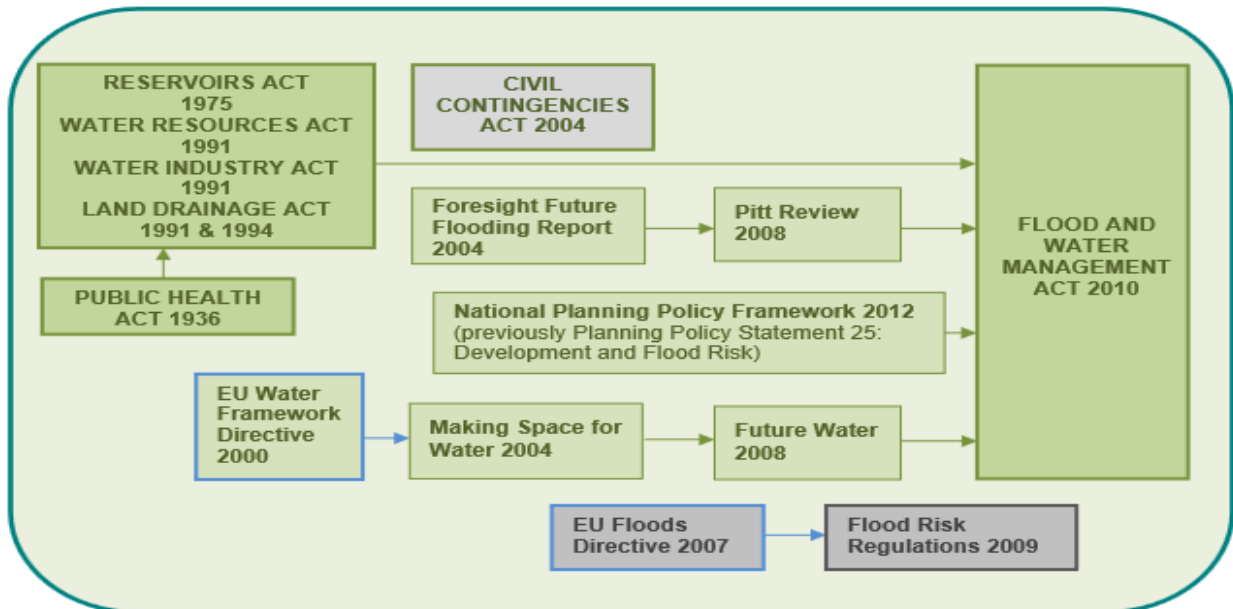


Figure 26: Flood Legislation in the United Kingdom (Source: Devon County Council, 2015)

Within the UK, the EA operates as a regulatory body who provides guidance on measures needed to protect homes from floods. Effective flood risk management offers an important role for the UK in the defence against hazards and protects communities, businesses and infrastructure (NAO, 2014). Legislation is the basis through which regulatory bodies can enforce/implement means to combat flooding. Under the Climate Change Act (2008), there is a general duty to adapt and mitigate the dangers from climate change with Local Authorities taking part in ‘active strategies’ to achieve this goal. As climate change can increase flood, these strategies seek to promote a policy of adaptation. As a result, the regulatory framework operates with the goal of empowering flood management by providing guidance, policy and regulations.

3.2 Regulatory Bodies

In the UK, flood management involves a complex framework of institutions that are responsible for its administration, finance and service (Brown and Damery, 2002). Defra and the EA take the leading role in developing strategies to mitigate the effects of flooding. The EA operates as the primary authority and has a supervisory duty on matters of flood defence (Brown and Damery, 2002). Legislation such as the Environment Act (1995) confer investigatory powers to the EA in the commission of its duties. The Flood Risk Regulations (2009) placed duties on the EA and local authorities to prepare flood risk assessments, flood risk maps and flood risk management plans (Defra, 2009). Though operating in the role of flood defence, legislation also imparts on it a duty as a flood risk management authority.

Cooley (2006) stated that, “*land-use management is among the most effective mitigation measure available*”. Thus, proper control over its management is deemed as the best approach in managing flood risk. The Environment Agency (2009) noted that developing in such areas means being exposed to flood risk. It is for this reason that their guidance is to avoid developing in such areas as this eliminates the risk.

4. DISCUSSION

Flood risk management was identified as a national priority area of development (HM Government, 2012). Floodplains suffer from added risk of flooding that can be mitigated by implementing regulations to reduced its impact and manging the flood risk. According to Hall et al. (2003), flood risk management uses a strategy that seeks to review prior decisions made with the aim to “*reduce, control, accept, or redistribute risks of flooding*”. Thus, it distinguishes itself from flood defence as it seeks to mitigate the impact rather than avoid it entirely. Flood risk management has been noted as moving towards a continuous holistic approach that emphasized the need to analyse, assess and mitigate risk on a catchment scale (Sayers et al., 2013). Despite such features, there have been significant cases of damage to properties as a result of flooding. The EA stated that one-in-six properties among 5.2 million such residences in England experience a risk of flooding (Abbey and Richards, 2016). In both residential and non-residential properties, expected annual damages are estimated to be more than £1 billion that are at risk from flooding (Bennett and Hartwell-Naguib, 2014). Similarly, flooding has led to 2.4 million properties at risk from river/sea, 3 million suffer from risk of flooding from surface water and 1 million are exposed to flood risk from both (Law Society, 2016). In 2007, the summer floods resulted in heavy downpours that caused 55,000 properties to be flooded (Defra, 2009; Jha et al., 2012). Similarly, the Bonfield Report has shown that sustained rain in 2016 led to extensive damage across the country with 17,000 properties being flooded and costs expected to amount to £1.3 billion (Defra, 2016). Reports indicated further research could bring about better management in order to reduce flood events (Efrac, 2008).

There exists a need from policy and law to regulate and mitigate flooding due to it being an ever-present danger. The UK Climate Projections (2009) noted floods being among the extreme events to affect the country, with greater frequency in the future (Defra, 2009). A Climate Change Risk Assessment (2012) indicated the UK being already vulnerable to extreme weather changes from flooding and heatwaves. This highlights the key goal of avoiding developments should they be made in areas designated as being inappropriate due to flooding. However, it highlights that developments could be made if safety measures, such as adaptations, were made in case of flooding. An Environmental Audit report highlighted, “*planning system also has a flood defence role to play by minimising development on floodplains and maximising the use of 'sustainable drainage' techniques*” (House of Commons, 2015). This system attempts to steer such developments away from areas of risk. It was noted that crucial changes in flood risk management came in two aspects; a shift from reliance on physical power to social power and that no single organisation has the power to affect change (Pender, 2011). Thus, a holistic approach combines the various organisations power for the use of effective floodplain management that can only occur through regulatory influence.

Insurers have sought better control of floodplain development and increase spending on flood defences (Crichton, 2012). This shows that better regulations and guidelines are needed to

control flood risk management including those in the floodplain areas. Crichton (2012) noted floodplain developments have become easier through a succession of planning policies and due to reduced flood defence spending. As such, rules come into effect as they create the boundaries on the use of power. According to Pender (2011), “*legal frameworks are the archetypal system of formal rules, whilst governments are the archetypal setters of formal rules*”. A research gap identified from literature shows a lack of a coordinated strategy towards managing flood risk. Pender (2011) noted holistic approaches to managing flood risk is needed to better cope with impacts of flooding and climate change. The OST Future Flooding project sought to develop a holistic thinking approach to flood risk (Pender, 2011). Similarly, Surminski and Eldridge (2015) noted that there does not exist a long-term strategy to managing flood risk with flood insurance affordability being a short-term perspective. In conclusion, they said insurance was simply, “*tool amongst the many that are required for a holistic strategy on flood risk management*” (pg. 12). Insurance operates by covering unexpected losses but it does not prevent the risk of flooding from returning. Thus, they noted that risk reduction operates as an important element in combating flooding with the use of effective planning policy along with flood risk management playing an even more important role.

5. CONCLUSION

Whilst floodplain management has faced increased improvements over the years, research has indicated that the danger posed by flooding is set to increase in the future. Floodplain development has increased according to research and literature has shown that goal of a holistic approach towards floodplain management is in need of further improvements. Aspects such as insurance and flood adaptations operate independently from that of Flood resilience. Thus, this misses the goal of improving flood resilience, response and management. Such a gap can be better resolved through the use of regulation, legislation and policy to address this missing link. By linking policy and regulations flood resilience with a long-term strategy this could see a more holistic approach to being adopted with regards to floodplain management in the UK.

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