# ENHANCING COMMUNITY RESILIENCE TO FLOODING THROUGH SOCIAL RESPONSIBILITY

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ABSTRACT

Climate change has increased the threat of flooding to communities and presented the need for greater understanding of barriers and drivers to community resilience. This presents a significant research challenge due to complex interdependencies between the built environment, flooding, and the decisions of individuals within the community. The decisions of individuals that make up key community groups are of vital importance to this area because these decisions affect their perceptions, behaviour and cumulative resilience at community level. The decision making of community groups could be positive, resulting in resilience-enhancing actions, or negative, resulting in resilience-reducing perceptions and behaviour. Therefore, understanding the factors that influence the decision making process will help to overcome barriers and promote drivers for community resilience. This paper explores the literature in one of the main areas that has been highlighted as having the potential to affect decision making at community level, i.e. perceptions of social responsibility. Differences between social responsibility and corporate social responsibility and public relation models are explored. Examples from recent flooding events suggest the important role of social responsibility in influencing community resilience. Main considerations for future research are described, including the need for establishing a common framework for measuring and monitoring social responsibility within the community. Such a framework would provide a platform for integration and joined-up thinking between key community groups.
*Keywords: behaviour, climate change, community resilience, decision making, flooding, psychology, risk perception, social responsibility.*

## 1 INTRODUCTION

Human activity is having a large, detrimental effect on the environment, increasing climate change and thereby increasing the likelihood of severe flooding [1]. Furthermore, as climate change becomes an ever more serious threat then flooding in the built environment will become ever more frequent and more severe [2]. Climate change is altering weather patterns all across the globe and creating changes that our global ecosystem is now struggling to cope with [3]. Our built environments have become increasingly merged with the natural environment, making both more susceptible to flooding. The ageing physical infrastructure, rapid economic development and growing populations all add to the vulnerability of our built environments to severe floods [4].

Communities, organisations and people in general are often ill prepared to cope with flooding, with physical resilience measures proving to be largely ineffectual and forecasts based on past events unable to accurately predict our ever changing world [4]. This has meant that society has become more vulnerable to the effects of flooding and in 2007 there was widespread flooding in the UK which caused an enormous amount of damage as our fragile infrastructure was not able to cope with such extreme weather [3].

This vulnerability within modern society is not limited to flooding events, as evidenced by the 2003 heat wave that caused a large loss of life throughout parts of Europe [5, 6]. Even the snow storms that occurred in 2009 managed to cause chaos to transport networks and supply chains. Therefore, extreme weather events pose one of the biggest threats to UK society as climate change and the fragile infrastructure of our everyday lives combine to create this


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modern risk. To ensure the survival and well being of individuals, it is of up most importance that appropriate strategies are devised to improve the resilience of our communities. This calls for a greater understanding of factors (e.g. drivers and barriers) influencing resilience and the interrelationships between key stakeholders of the community.

The research reported in this paper explores perceptions of social responsibility as a way to enhance understanding of the decision making process and interrelationships between three key community groups (policy makers, householders and small businesses) in order to improve the resilience to flooding of the local community. The discussion suggests that a better understanding of social responsibility, the decision making process, and interrelationships amongst members of community will help nurture joined-up thinking and optimise the selection of adaptation and mitigation strategies to flooding events.

## 2 THE FLOODING ISSUE

In 1953, an extreme flood in the Thames estuary and East coast region flooded 240,000 houses and killed over 300 people. A tidal surge within the same area nowadays would cause damages of £80–100 billion to homes, businesses and economic activity, affecting 1.25 million people [7]. While expansions in particular locations may help to accommodate the increasing population, it also increases a community's vulnerability to flooding, as there is more damage potential contained within smaller areas. Much of the land is already developed, or protected, forcing planning authorities to build close to, or actually within, tidal flood risk zones [8]. The impact of an extreme flooding event would also have an impact on a global scale, particularly in London where many business headquarters are located [9]. As the population continues to grow denser on floodplains across the UK, the vulnerability to extreme flooding events has risen.

The UK floods in summer 2007 launched the largest rescue effort in Britain since the Second World War [3]. Despite being aware of flood warnings, many people did not expect the flooding to affect them and did not know what preventative steps to take or who to contact for help [3]. In 2008, many communities were still recovering from the floods and it is recognised that there are many lessons to be learnt to improve the way we deal with flooding in the future [3]. Therefore, it is of utmost importance that measures to increase resilience to flooding are found.

## 3 UK RESILIENCE TO FLOODS

The severe flooding of 2007 came after the wettest May to July period ever recorded [3]. This indicates that the risks we face are increasing and we have not yet found a sufficient way to counter this risk. This is because although the government has been attempting to adapt to new risks, it has done so through the creation of new legislation and implementation of new civil protection measures, the majority of which have been built around an already stretched communication network and using already stretched resources. It should not fall to the formal organisations and institutions which are the functioning arm of the overburdened network to increase resilience to such events as they are far too embedded within the fragile infrastructure itself, adding frailties to resilience measures themselves. These interdependent organisations have their place to increase resilience, but it may not be possible for them to achieve the kind of results that could protect modern society to a sufficient level. Instead, it is the extended branches of the network, the communities themselves who could make the greatest advances in creating resilience to flooding. This is a view echoed by the *Foresight Future Flooding* report [10] and the Stern Review [11] which highlight the importance of informing everyone about the risks posed by climate change and how it may affect their daily lives.

The uncertainty surrounding climate change is mirrored in the uncertainty surrounding changes that will happen at the social and economic level over the course of time. This puts our man-made world at an increased risk of disaster, with ever more lives and livelihoods in danger of being swept away by levels of flooding that have never before been experienced. Therefore, the quest to protect our built environment from flooding has never been of such great importance, and above all the forecasts and technologies of the modern age, it is still the people that remain the key to a successful defence. However, research has so far neglected to fully investigate the impact of these findings within the built environment with which we are most familiar and is most salient to our needs, our own community.

## 4 MODERN COMMUNITIES' OVER-RELIANCE ON INTERCONNECTEDNESS

The majority of people in the UK live in urban areas that rely upon an enormous amount of support from organisations to provide them with the water, electricity, gas, communications, transport and food that are necessary elements of everyday life. The systems of this critical infrastructure are reliant upon increasingly complex technology to provide them with greater interconnectedness. However, the networks that organisations use to support such a large amount of interdependencies are based on an outdated infrastructure that lacks the capacity to support our ever more complicated lifestyles. Our societal infrastructure struggles to support us now and the demands placed upon this system of networks will only become greater over time [3]. This enormous amount of interconnectedness means that should an extreme flood take place then these interdependencies leave communities vulnerable to the effects of flooding. Disasters often strike at the heart of the critical infrastructure and in a system where even the smallest of disturbances to the network can create enormous amounts of disruption to many people, disasters contain the potential to devastate our national infrastructure and thereby affect every aspect of modern life. This is a risk we are living with every day it is important that society finds new ways to reduce its vulnerability and increase its resilience to flooding.

One of the main reasons why society is able to become more interconnected is through technological advancements in many industries; however, the 2007 floods also highlighted the danger of becoming reliant upon technology. In the Thames Region, the Regional Telemetry System partially failed, thus providing no data to the National Flood Forecasting System (NFFS) [3]. On one site, a failed river alarm resulted in 23% of all properties not receiving a flood warning in time [3]. A number of Environment Agency river level gauges reached their recordable limit, were inundated by flood water or lost power, while others were inaccessible due to extreme flood conditions and could therefore not be read [3]. During the summer 2007 flood, 50% of the flood defences that were tested by the flood waters were overtopped [3]. These failings were found in technological resilience measures across the country and together they demonstrate why new, non-technological resilience measures must be found. One of the main areas to emerge from the discussion of resilience of how this may be achieved is the idea of individuals being more socially responsible and accepting a greater level of individual responsibility for community resilience.

## 5 SOCIAL RESPONSIBILITY

Social responsibility is a term that has been utilised in a variety of forms but is widely recognised as relating to the relationships between the economic, environmental and social aspects of an organisation or groups activities that endeavour to benefit society [12]. It is largely agreed that social responsibility is an important topic not only for the business

environment but also for wider society, with negative effects, such as new legislation and adverse publicity, seen as arising from a failure to recognise and maintain a suitable level of social responsibility [13]. Social responsibility has also long been an important field of research for both academics and business practitioners and continues to provide a valuable research area for those wishing to investigate modern societal issues [13, 14]. Social responsibility has been the focus of research that has investigated business social responsibility by exploring and comparing the perspectives of businesses and social workers [15], investigated the relationship between perceptions of personal and social responsibility and intrinsic motivation in the field of education [16] and explored social responsibility as a factor when investigating genetic and environmental components of pro-social attitudes [17]. These studies indicate that personal responsibility for behaviour is important to increase resilience and understanding how people perceive themselves and each other in relation to a particular aspect may be a useful way of investigating that aspect itself. Therefore, exploring perceptions of social responsibility for flooding events will provide an excellent platform from which to investigate barriers and drivers to community resilience.

This platform though must explore social responsibility from a person-centred perspective, rather than the business-centred perspective associated with Corporate Social Responsibility (CSR). Much previous research has largely focused on how businesses attend to societal needs through CSR; however, it could be argued that this has largely been an investigation of public relations rather than actually exploring the processes associated with social responsibility. CSR and public relations share such strong similarities in their origins, theories and practices that the distinction between the two fields has become blurred. It has even been stated that public relations is simply the practice of social responsibility, despite there being key differences between these two fields [18]. Therefore, when one thinks of social responsibility they think of the responsibility that businesses have to the general public and how they communicate information to the public and act upon the feedback [19, 20], however this may actually be a more fitting description of the foundations of public relations models, such as the four-step management process [21] and the RACE framework [22], rather than social responsibility. Even the foundations of CSR models themselves, such as the four-step process of corporate social involvement [23], may not be suitable to investigate the relationship between social responsibility and community resilience. This is because CSR models are built with the purpose of being related to the business, with the public being a part of this particular business process. CSR is influenced by a number of driving actors, such as investors, consumer demand, government regulation, supply chain requirements and civil groups, all of which apply in varying degrees to different businesses [18].

However, with community resilience it is not solely the community group's responsibilities to each other which is being investigated, but is instead their responsibilities to the community itself and their roles within it. This is an important distinction that highlights why social responsibility is an independent aspect, rather than CSR, which is a business orientated view of social responsibility, and public relations models, which although do allow a two-way flow of information are not suitable for climate change research as they do not provide true equality and integration between multiple community groups as again they have been created for a different purpose. It is unknown therefore whether or not the drivers identified for social responsibility in a corporate context will apply to perceptions of social responsibility in relation to climate change and this paper proposes a different use of social responsibility as a research tool.

Given then that community resilience to extreme weather events relies upon the successful integration of each of the three key stakeholder groups, householders, Small and Medium Sized Enterprises (SMEs) and policy makers, then it is reasonable to suggest that social responsibility research should not be conceptualised or investigated as a circular process, as this limits integration, which this paper suggests is a necessary component of future resilience measures. Social responsibility research instead needs to investigate perceptions of the roles and responsibilities that the key community groups have not only of themselves, but also how they perceive the other groups, with new ideas generated and communicated by each of the groups rather than the public simply providing feedback on business ideas or policies, creating a multi-path framework of perceptions and providing a basis for integration. Exploring social responsibility in this integrated manner will highlight potential links between these community groups, how they are contextualised by social responsibility and how they may affect overall community resilience. For example, it is reasonable to state that householders may expect policy makers to do everything they can to prevent flooding and policy makers may expect householders to do everything they can to lessen the impact if it does flood. However, history shows us that householders do not do anything until it is too late, such as ignoring flood warnings due to experience of false alarms, and when it does go wrong they then shift the responsibility to the policy makers. But the policy makers have to follow procedures which often assume that the householders are taking actions to lessen the impact of flooding. It is these kinds of gaps and misunderstanding of social responsibilities that can cause failings in resilience measures and drain extra resources. The householders are blaming the policy makers when in fact they have decreased their own resilience (by not taking actions to protect themselves) and their community's resilience (by allowing the flood to cause greater damage and thereby using up more of the limited resources available).

A real world example of social responsibility affecting community resilience to an extreme weather event in this way was observed in 2009 when the UK was hit by severe snow storms which tested the resilience of many communities. The storms highlighted major discrepancies between what householders believed the council were responsible for and what the council believed they were responsible for. An example of this can be seen when, as the snowfall became heavier, the council began prioritising main roads, meeting what they believed to be their responsibility to the community. However, in doing so they left many householders isolated and feeling that the council were not meeting their responsibility to the community. The resilience of many communities across the UK had been undermined by gaps in people's expectations of their own and other community group's social responsibilities. These gaps are indicative of barriers to community resilience and are brought about by a lack of integration and joined-up decision making between householders, local businesses and policy makers. Householders were not aware of the decisions being made by the council or of resilience procedures which stated that grit bins would only be provided upon request. The council believed they were attending to the needs of the whole community as resilience measures were in place; however, the community was not aware of these measures and believed the council had failed them. In the eyes of the council staff, the householders had failed to meet their own expectations of social responsibility by failing to request grit and maintain their own resilience levels. This makes perceptions of social responsibility within and between community groups of vital importance to resilience research.

The emergency services and utility companies are responsible for many of the immediate impacts of flooding in the built environment, but the continued successful resilience of the community in the short to medium term relies upon the groups which make up that

community, such as the householders, SMEs and policy makers. The Pitt review [3] supports the importance of these three groups, highlighting that local government plays a central role in managing flood risk, with community groups, such as local flood groups and the National Flood Forum, helping to inform the public of the risks they face before, during and after a flood event. The Environment Agency is forging stronger links within the community, conducting research and implementing action plans, such as the national project launched in 2008 which aims to record surface water flooding in order to produce a data set of the most vulnerable areas [3]. Businesses are beginning to understand the need for a business continuity plan, seeing it as a critical element of good business practice, gaining help from policy makers to increase their own level of resilience as well as better safeguarding the infrastructure which provide services to householders [3]. This highlights some of the interdependencies that the individuals within these three groups possess.

Communities are made up of individuals, each of whom can have an effect upon their personal level of resilience to flooding, which in turn will have an effect upon their community resilience. Thus, individuals have a responsibility to increase their own resilience and they can do so through the decisions they make about being aware of the risks faced by their community, accepting these risks and engaging with the issue of flooding. Unfortunately, many people are unaware or are in denial about the risks they live with each day, and it is these counterproductive attitudes and flawed decision making which needs to be changed in order to increase resilience. In order to instigate the necessary changes, researchers need to firstly understand how and why people reach the decisions they do about the risk of flooding, as well as understanding how the interdependencies within the community can affect these decisions. These individuals are not simply householders within the community, but also heads of businesses and local policy makers, each of which has a key role to play in increasing resilience. For example, why do local policy makers make the decision to build houses on flood plains when they know that this decreases their community resilience to an extreme flooding event? Why do householders and businesses make the decision to occupy buildings on flood plains when they know that this decreases their personal resilience to an extreme flooding event?

The example above indicates that there is a lack of individual and social responsibility being taken for actions that can affect personal and community resilience to flooding. We may live in a modern blame culture but there appears to be a lack of accountability for the tragedies that occur when the effects of disasters are increased because individuals have made poor decisions that have decreased their resilience to such events. Is it the fault of householders who choose to live there or the fault of policy makers who chose to build there? Too often floods are blamed on being an ‘Act of God’ when in fact a clear pathway of poor decisions made over a long period of time have contributed to the final damage caused by flooding events. Furthermore, the over reliance on others that is fostered through our modern interdependent lifestyles can also contribute to attitudes, decisions, expectations and behaviours which are detrimental to our resilience. It is time then for individuals to play a greater role in increasing both their personal and community resilience to ensure that in the future communities will be better protected against these events.

## 6 UNDERSTANDING INDIVIDUAL ROLES IN RESILIENCE

In the US, personal responsibility is recognised by the Federal Emergency Management Agency as being the key to building a resilient community [24]. However, there are many views on how much of a threat climate change poses, indicated by some people suggesting

that immediate action should be taken, others suggesting that the scientific evidence is unreliable, or given the uncertainty nothing should be done until there is more reliable evidence, or simply not believing that climate change affects their lives in any way [25]. It has been shown that households, SMEs and policy makers underestimate risks that appear distant or global, such as the risk of extreme weather events which are rare [26]. These perceptions of risk can affect the engagement that each community group has with extreme weather event issues, which can in turn affect the resilience of the community to extreme weather events. This is because the interpretation of risk will determine behaviour [25]. Communities not fully acknowledging the information available and thereby not acknowledging the risk or understanding their roles and responsibilities has been seen in studies in the USA, Canada and Europe [27–30]. Particular community groups may not even acknowledge that they have any roles or responsibilities towards extreme weather events or community resilience at all, as even simple denial of the risk has been found to justify lack of action on climate change [31]. Given then that perceptions of risk are not well understood or even accepted by many community stakeholders then it is reasonable to suggest that perceptions of individual roles and responsibilities relating to this risk may contain both perceptual and behavioural aspects which are detrimental to community resilience.

Given that modern society contains masses of interdependencies to function efficiently, it is reasonable to determine that it will require further collaboration and joined-up thinking between key community groups to efficiently increase community resilience. This need for integration is reflected in community resilience models which have stressed the importance of community participation and the ability to communicate community problems [32], as well as the need to integrate community stakeholders [33]. However, many existing models, while emphasising that understanding interdependencies between community groups will be beneficial, also note that generic models of community resilience have so far failed to specify the content of such interventions, knowledge that will be required to positively affect resilience factors [34].

This aspect is further emphasised by the need to integrate community groups within climate change education, as top down information (i.e. policy makers telling people what should be done) does not work, and bottom up information (i.e. community groups integrating information together) is needed to improve risk communication and community resilience [35]. Therefore, while social responsibility has been highlighted as a potentially key factor for affecting community resilience, it is yet to be explored in enough depth to provide contextual information towards understanding how and why these effects occur. However, what can be assumed is that in order for people to understand how and why they must be more socially responsible to increase their resilience to flooding, they must first understand what constitutes resilient behaviour.

The Pitt review [3] uses the real life example of a householder who was flooded in 2000 and then again in 2007, but having adopted a number of resilience measures after the first flood the householder had reached a level of resilience where they were able to return to normal very quickly. This householder made the decision to increase their individual resilience to flooding, which in turn has increased the resilience level of their community and placed less of a strain on resources and infrastructure. Unfortunately, the overall take-up of resilience measures is low, even for simple, low-cost measures [3]. Some of these practical resilient measures may mean additional costs, but will reduce flood damages in the future [36]. However, many tenants simply refused to accept that their properties may flood again, and it is this lack of responsibility to themselves and their community which undermines current

resilience measures. Norwich Union found that 46% of people did not believe that it was their responsibility to take resilience measures, stating that this responsibility lay instead with local authorities and the government [3]. These kinds of perceptions create barriers to resilience, with each community group believing that the other is responsible for taking resilience measures.

The Pitt review [3] also provides information about farmers in Upton-upon-Severn who used their equipment to minimise flood damage, displaying a high level of social responsibility. It is important to identify the level of social responsibility an individual must possess in order to make the decision to engage in resilience promoting behaviour, and what social and psychological barriers lie in the way of this being achieved. The Pitt review [3] calls for a greater degree of personal resilience and a community consisting of a greater number of socially responsible individuals would have a higher resilience to flooding due to their combined resilience levels. These individuals would understand their role within the community, rather than believing that it is someone else's responsibility and being overly reliant upon other community groups. In turn, the better prepared an individual, business or local authority is, the less they will be affected by the flood and the more time and resources they will have to fulfil the roles that do require them to help others within the community.

Therefore, it is important to understand how the three key community groups perceive their own level of responsibility and what they perceive to be the responsibility of others, in order to highlight where barriers to resilience are being formed. If we understand communities as being a complex system of interdependencies, the resilience of that community is determined by the system's ability to absorb disturbance, self-organise and capacity to learn and adapt. Therefore, it is the attitudes, perceptions, decision making and behaviours that members of a community adopt or display prior to a flooding event that can determine the ability of that community to absorb the disturbance. Furthermore, these aspects may also determine their motivation and ability for self-organisation during the event and how much they are willing to learn from the event in order to change their perceptions and behaviours so that resilience can be increased in the future. Therefore, research needs to fully investigate what current perceptions of social responsibility exist within the three community groups and how their interrelationships may affect their own resilience levels, as well as that of their community. It is only when we know what are the current perceptions of social responsibility within and between community groups, we can take the necessary action to overcome any barriers to community resilience that may exist.

## 7 CONCLUSIONS

Flooding represents a serious threat to UK communities and in order to better protect ourselves, we need to understand barriers and drivers for resilience at community level. Community resilience is largely affected by the decision making of its key community groups and therefore a better understanding of factors affecting the decision making process is required. This paper has highlighted the potential of social responsibility to affect decision making. However, there are a number of considerations to be taken into account by researchers in these areas.

It is important to understand that many social and psychological factors may not be distinct from each other and may influence and affect each other, as well as the overall decision making process. This can be seen where a better understanding of perceived social roles and responsibilities would provide a context for exploring perceptions of flooding risk. If we take one key community group, householders, as an example, if an individual did not believe that the

risk of flooding was great then they may not engage in any resilience-enhancing actions. However, simply stating that there is a linear relationship between perceptions of risk and engagement in resilience-enhancing measures does not provide a full enough picture to inform future resilience measures. Instead, understanding how that individual perceives the level of involvement that householders currently have with these issues and the responsibilities they have as a community group in relation to these issues requires further exploration. What resilience-enhancing actions do householders believe they should be engaging in, or are able to engage in? Do householders feel that they have certain responsibilities that they should meet? How do the perceptions of the role of householders change before and during flooding events? This example and the questions it raises also extend to the other two community groups of SMEs and policy makers. This then raises questions of how do these three key community groups view each other's roles and responsibilities and are there any gaps between expectations of others and understanding of one's own role? These gaps would be potential barriers to increasing community resilience.

Future research should also consider the effects that each stage of the decision making process will have on the other stages, for example, community level decision making may be improved through increasing acceptance of other views and integrating agencies within the community in the decision making process, such as householders, SMEs and policy makers. Each person is a decision maker in their own right; however, it is often joint decisions and a joint effort which is required. This integration may be able to promote trust, increase access to reliable information and communication of risk, as well as aid in identifying individual roles regarding resilience to flooding events. Policy makers could work with SMEs and householders to remove any 'policy obstacles', demonstrating how a greater understanding of social responsibility can highlight flaws in current resilience policies. It will also allow policy makers to see exactly where perceptions of social responsibility differ within the community, representing issues that need to be addressed so that SMEs and householders become more aware and more accepting of risk and better understand their own role in increasing community resilience. This is but a few examples of the broader considerations needed to make this process work, attempt to counter the many failings of previous measures and change patterns of resilience-reducing coping strategies and behaviours within the community by promoting engagement with the issue. One of the first tasks faced by researchers is establishing a common framework for measuring and monitoring social responsibility within the community. Such a framework will provide a platform for integration and joined-up thinking between key community groups. There is much work to be done in this field, but what can be concluded is that the role of perceptions of social responsibility is extremely important when trying to protect our built environments from flooding disasters.

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