The social effects of flooding on small rural communities in the UK; comparing Littleborough, Hebden Bridge and Whitworth

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Declaration

I declare that the main text of this dissertation is no more than 10,000 words, and is all my own work.

signed_____

Abstract

With the increase in the last 10 years in the number of flood events and the gradually increase in the severity of them, flooding is becoming one of the United Kingdom’s biggest problems. This dissertation will be looking at the social effects of flooding on small communities in the UK particularly those in the northwest with particular focus on three small villages that are relatively close together. These there place are all very similar in that they all have a river run parallel through the village centre these villages are Littleborough a small village directly next to Rochdale and a short distance away from Manchester, Hebden bridge a village located in the Calderdale valley what has flooded on and off over the past 50 years but in the last decade has become a particular hotspot for flooding and finally Whitworth another village bordering right next to Rochdale but on the northeast side which has no really history of extreme flooding but with the increasing levels of prolonged precipitation in the next decade if a severe storm event occurs near to it there is the possibility of heavy flooding. This study is looking into each of these villages individual and together to compare the different social concerns of flooding and each locations attitude towards the risk of flooding in their area.

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Chapter one: Introduction

Flooding in the United Kingdom has always a regular occurrence throughout its geographical history with having a wet climate and large areas of flood plains. The issues of flooding can primarily be attributed to most settlements in the UK being located next to or near to major rivers or their tributaries because of the original settlers being drawn to such location as an easy source of water. As settles grow in size the natural order of water transportation to the river and the regular flooding onto flood plains was disrupted as large areas of land were cleared and transformed over several generations from small early villages into town and some even on to large sprawling cities. But with this rapid change in terrain geological terms the rivers and their surrounding water systems were unable to adjust so quickly and so flooding becomes an issue. Most if not all cities have large systems of storm drains and well equipped sewer systems that can hand the large volumes of water that can quickly run off the smoothed tarmacked surfaces above but the focus for this study is on the much smaller settlements and villages that do not have sufficient flood defences and responses and are often overlooked in terms of the damage caused by flooding in more remote areas of the UK. The main aim of this academic investigation is to look into the levels of risk associated with each location and the perceived level of risk that residents in each village consider. The study will focus on three small rural villages in the northwest of England within close proximity of one another each having similarities in their size and how high levels of precipitation can affect them and has effected them in previous years. The first location is Littleborough a small village in the Rochdale area that had previously experienced flooding last in the early part of the 90s causing roads to be closed and several rows of terraced housing to be flooded. Currently the area is no longer suffering from flooding as major plans were carried out by the local council to strengthen the river's banks and straightening the river as well as modifying tributaries to better controls the flow. The second location that will be focused on is Hebden Bridge in the Calderdale valley area situated around half an hour by road from the first location of Littleborough. Hebden Bridge has suffered severe flooding regularly in the past decade with it being worst hit during July 2012 with heavy precipitation levels over a period of several days the village centre, majority of the high street and several residential location being flooded a total of three times in the space of four weeks several crippling the local trade causing several shops to shut altogether and those that managed to stay open have fear a repeat will put them out of business due to insurance being either too high or just being uninsurable . The third location

being focused on in this study is that of Whitworth another small village located near the town of Rochdale but to the north east on the other side. Unlike the other two locations Whitworth is not prone to flooding regularly and doesn’t have a history of severe flood. However in the past five years on two separate occasion the main river running through Whitworth has had uncharacteristically high levels in the river channel during periods of extreme rainfall, on both occasions the river could have flood several area if the level of precipitation had continued leaving several residential areas damaged by the flooding. The study aims to look into the effects that flooding can and has had on these areas both social and economically, contrasting these three similar areas to give a better idea as to the feeling of the residents of each area and whether they are aware of previous flood events, the likelihood that they will be affected by one in the future and if so are they willing to stay in the area and simply adjust the damages that could be cause by such events and attempt to better defend their home against flooding with personal flood defences or would they prefer to simply move out of the area.

1:1 looking at the increasing problem of flooding

In the past decade flooding has gradually become a much more regularly occurring threat which can be attributed to several changes both in climate and also the landscape of the United Kingdom and there' s changes together have caused widespread flooding. The scale of the flooding ranges from small more concentrated floods such as the cases in Hebden bridge in July 2012 and the mass flooding of Gloucestershire and surrounding areas in late summer 2007. The main concern for such extreme levels of precipitation are down to our rapidly changing climate with Britain having more severe weather every year the frequency of which flooding is occurring in different parts of the UK is become more of a problem. However we obviously have an inability to change the climate in anyway resulting in the solution being in better management of the UKs Rivers and flood plains. The main problem is that each individual river requires a different solution to reduce the likelihood of a flood event occurring which causes the dilemma of which locations to improve the flood defences of as it is difficult to determine where the most likely place to flood is or if areas that have been flooded will flood repeatedly in the near future as it seems pointless to reinforce an areas flood defences if the river is not likely to flood again In the near future. The main issue that flood prevention and protection boils down to is cost i.e. is it worth spend several million pounds to build flood defences to protect only a dozen houses or is it better to let them flood and pay-out insurance and compensation costs. Flood defences such as levees and flood control gate can help to reduce likelihood of flooding occurring but these measures are not a certainty and the failure of these measures can cause greater damage to the surrounding area even more so than if defences such as levees weren' t there. The best example of this is in the United States of America in 1993 when the upper section of the Mississippi River at peak flow after several weeks of heavy rain burst its banks and cut its way through the manmade levees causing incredible amounts of water to flood into the surrounding areas destroying acres of farmland and damaging or totally wiping out thousands of homes. The importance of the levees was commented on in the aftermath of the destruction, it was speculated that if the levees were not constructed then the amount of water the river could hold at its peak flow would have been greatly reduced and the level of widespread flooding and destruction would have been on a much smaller scale to that which was caused. Although the other side of such an argument is that although there was a great deal of damage and devastation once the levees had broken if they had not of been there then there would have been much more frequent flooding and the cost of these untold

amount of flood is what really mattered. What was being suggested by the anti-levee side as it were was that the areas either side of the Mississippi should be left to return to their natural flood plains rather than artificially controlled, this would allow the river enough space to naturally flood and meander on the flood plains away from the relocated towns and villages. This sounds ideal in theory but the amount of civilians being displaced and the area of farmland that would be lost to allow the river to run its natural course would be considered by the general public of the area and the owners of said land to consider this a price too high to pay rather than having the highly unlikely threat of the river flooding that severally again. Trying to implement this idea in the UK on a smaller scale like Hebden Bridge it would be much more difficult as the villages is built directly around the river itself with many building and roads situated right along the riverbank making it difficult to either give the river flooding space or enough space to improve or add flood defences such as levees of flood gates. This problem is a recurring one across the UK with many small villages finding themselves restricted as to what can be done to adjust the width of the river as the majority of the river has roads or buildings already right next to the banks of the river.

1:2 background on each of the three study locations

Littleborough is a village in the northwest of England close to the border between Lancashire and Yorkshire and falls under the Rochdale council' s borough as well as technically being in greater Manchester. The area surrounding Littleborough if fairly rural with several farms, playing fields and public footpaths of particular note is Hollingworth lake just to the south of the village as well as Blackstone edge reservoir to the east on the road up onto the Pennines as well as five other reservoirs scattered about the hills in the surrounding are to the east and north east. The name of the river running through the centre of the village is the River Roch and runs parallel with both the Rochdale canal and Todmorden road which is the main area which was repeatedly flooded several times in the 1940 and 1950 causing several rows of terraced housing which have since been demolished to flood yearly and with such frequency that the old police station which is no longer in use originally have a boat by the side of it the help evacuate the house when the flooding became serious. This was eventually stopped with the introduction of minor improvements made to the river the stabilised the banks and channel. However between 1998 and 2002 the river burst its banks yearly flooding the road and causing minor damage to the houses situated around the river. However in 2004 work began on the channel of the river to help quicken the speed of flow, deepen the channel itself and increase the strength and height of the banks. The new channel was officially opened on the 13th July 2005 with this stone carved sigh put in place to commemorate the work done (as shown in figure 1.1). Since these alterations were made this section of the River Roch has yet to flood again. Other editions to the river reinforcement included strengthening the tributaries that feed into the river roach from the Pennines and Hollingsworth Lake (see figure 1.2), this was done by using large wire cages filled with large stones and rocks to give the

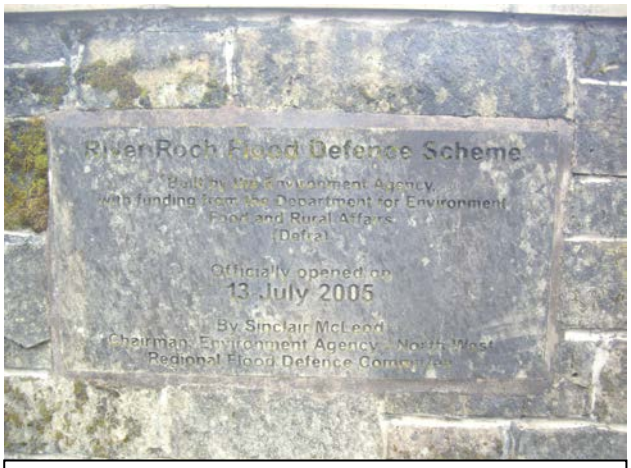

Figure 1.1 sign detailing river Roch flood defences

Figure 1.2 reinforced river Roch tributary

weak banks more support as well as leaving enough room for water to move throug h. This is a lot more effective that concrete as it allows a more natural flow to occur into the river. also over time the rocks become filled with sediment and moss effectively hiding the unnatural parts of the reinforcements.

The second location highlighted in this study is Hebden Bridge a small village situated in the Calderdale valley in Yorkshire where the river Calder runs directly through the centre of the village. Similar to Littleborough the river has a canal running in parallel to the river and directly through the village centre. The area surrounding Hebden Bridge has always been a hotspot for flooding during times of heavy rainfall but within the last decade with the rapid increase in both the amount of precipitation and the frequency of which it occurs Hebden Bridge has begun to flood more often and much more severally. The primary example is July 2012 when the river burst its banks 3 times in the space of a month this caused a great deal of damage to several homes but the biggest problems where that faced by the self-employed show owners on the main high streets in the village. With the river flooding the centre repeatedly after each clean up the shops were closed for over a month, without customers and the constant cost of reopening nearly destroyed shops several of the shops on the main high street have simple taken the insurance money after the last flood event and put their shops up for sale leaving one side of the main road into Hebden Bridge looking severally rundown and abandoned. On the other hand some shops have been forced to reopen with no prospect of being able to sell a building in a location where flooding is becoming more frequent the commercial side of the village is become ever more resilient to the possible threat of flooding.

The final location this study will look at is Whitworth a small village just to the northeast of Rochdale, the river running past Whitworth is called the River Spodden. The river starts at the Cowm reservoir just north of Whitworth and flows south past the centre down into a second reservoir before joining the River Roch. The river Spodden itself is fairly small after compared to the other two rivers being used in this study, but in the past decade several flood warnings have been issued to the area by the environments agency the lasting being in July 2012 (environments agency, 2012). These alerts have become more frequent in the last several years suggesting that the river may become prone to flooding regularly if the level of precipitation that falls in the area continues to increase as it has been doing. Whitworth itself is the smallest and the least populated of the three study areas and hasn’ t flooded severally in recent memory. Although it is increasing in size with two housing estates built in

the last 10 years the area could very quickly become a much bigger housing area and with the removal of open green spaces the amount of run off and the speed at which it get to the river could cause the big problems for an area with such as small river channel. The ideal solution would be to widen and deepen the channel now so if there is a sudden increase in the level of precipitation

1:3 aims and objectives

Aim one : to collect data from the residents of each of the three study location that have been chosen and discover the general perception of threat caused by the increase in likelihood of flood events and high levels of precipitation occurring.

Hypothesis one : there should be a direct correlation between which village a person lives in or near and there perceived level of threat caused by flooding or the threat of flooding in the future. the area that should be most concerned about the threat of further flooding is Hebden bridge.

Aim two: to compare the opinions of different areas on whether it is more viable to simple move out of an area if possible rather than stay and purchase and build flood defences.

Hypothesis two: people are less likely to move out of an area that floods regularly if they have adapted to the idea of regular flood events rather than those that have either not been flooded previously or those that have moved into an area that floods unknowingly.

Chapter two : literature review

The literature for this study covers several areas as the problem of flooding not isolated to the UK, it is becoming a global issue as climates around the world gradually become more extreme with hotter summers and colder wetter winters. Climate change is a big factor in the amount of flooding that' s occurring both in the UK and worldwide, these changes to both regional and global climate are going to steadily continues to subtly increase with more and more flood event occurring each year, this sort of rapid incremental change will steady be the undoing of both rural and urban environments. The book *cities and flooding a guide to intergrated urban flood risk management in the 21st century* has a chapter on implementing intergrated flood risk management plans, these are put in place in urban areas to set up an infrastructure thatis supported by both the government and its organisations as well as the culmination of communities coming together and being engaged with via to set up not just an action plan as to what the governmental side does when a flood occurs but all that the public are aware of what is happening to them and what is happening behind the scenes to help both parties have all the knowledge and resources need to get through a flood event. Other global flood events such as the increase in flash flooding in various different areas of the globe such as the severe widespread flooding in Spain in September 2012 and the flooding in Australia in march 2012, the severity and the frequency of large scale flooding is becoming more widespread. . One document looking at the future of climate change and want affects it will have on the world in terms of urban adaptation to more severe weather *Flooding in the future : predicting climate change, risks and responses in urban areas* (2004) looks at the changes that will need to be made to not just the way we use storm drains and sewers to remove water from urban areas but the physical designs of builds may need to be revolutionised to help increase runoff rate and drainage speed. It suggests that "It shows that flood risks may increase by a factor of almost 30 times" and that without the introduction of new innovative designs in builds that "traditional engineering measures alone are unlikely to be able to provide protection". This presents an interesting idea that it' s not just the way that we change the direction of the river and its flow but we need to adapt other aspects of how we build our urban environments such as the semi-permeable road surface that are being design to be durable enough that it will not wear away under the pressure of constant road activity but will have small sponge like holes running through it' s the help the water permeate it way through as if it were soil. Flood hazard mapping is an old but still very effective way of planning out and marking areas that

are more at risk of flooding that others with simple colour coding to show areas on the map that are regular flooding boundaries and that of the 50 year flood or the 100 year flood level, these can easily be produced and are easily understandable and should really be more widely distributed both locally and through the media. The advancement of these types of technologies can help to reduce the likelihood of flooding in areas that are considered to be at a constant rise, the effects of an area constantly being flooded or simply having the threat of being flooded a constant possibility can have both health related and social effects on individuals as well as whole communities, *Vulnerability to flooding: health and social dimensions* looks at the long term effects on communities that are vulnerable to flooding and assesses the impact of flooding those that have to live with it. This text highlights the importance of focusing on the social aspects of a flood event as well as the rebuilding process, with the exposure to adverse conditions for an extended period of time due to flooding. Linking in with both these texts Is a planning policy guidance journal which covers the rules and regulation on where and what types of land various different types of buildings can be constructed on depending on the likelihood it will flood and looking at the previous development that had happened on any piece of land that is being considered to be rebuilt on. The *planning policy guidance notes 25: development and flood risk* help to determine the practicality and safety any construction occurring on a possible flood risk sight. However these guidelines were published in July 2001 and during the period of time since then that flooding is become a much more widespread occurrence and these regulations may already be outdated as area that have been built on may now become flood risk areas with the increase in high levels of precipitation over prolonged periods of time. It could also be changed so that the buildings themselves are much more flood friendly such as the better drainage and runoff system built into the building as suggested by *Flooding in the future : predicting climate change, risks and responses in urban areas* it would be much more reasonable to not just look at the environment and what impact the building will have on the are but rather look at how we can incorporate features into the structure of them to help reduce flood damage and help increase drainage.

Flooding in northwest England: a history c. 1600-2008 is a record and deconstruction of flooding in the northwest over the past four centuries looking at the expansion of mill towns and villages and their impact on the severity and frequency of flooding. It looks at rural, urban and coastal flooding such as the improved Blackpool front to help reduce the damage cause by strong tidal flooding. The text uses a combination of old records and maps as a

contrasts of the drastic changes that have occurred in the last several centuries, a section of particular note is a table complying a list of damages cause by flooding in various places around the northwest and looking at how much it cost during the time of flooding and in comparison what it would cost today as well as another table with a similar list of floods through the last several centuries and presents it as a table of fatalities in northwest floods this gives an interesting comparison on both the economic cost of severe flooding and the cost of life caused by adverse weather conditions.

Chapter three: methodology

The main studies took place over several weekends in February 2013 spending several hours in each location attempting to get a wide range of the local demographic of ages and sexes to give a better distribution on results.

The decision to use questionnaires was taken over a focus group as I wanted to speak with each participant individually so I their answers and responses were not hindered by other people' s opinions and previous answers so that the information I would obtain from them would better reflect their person thoughts, feeling and experiences. For the questions themselves they need to be few in number so not to irritate or cause loss of interest in them while also trying to procure as much information as possible. The other factor while composing the questions was to take into account that the subjects that would be talking about may have affected the person being asked in the past so it was best to avoid asking personal questions about the amount of property lost or an injury suffered as to not upset the person being asked. Also rather than asking for exact postcodes or addresses that the interviewee may not feel happy about providing they were asked to estimate how far they were from the river in their area giving a better idea of where they lived in relation to the flooding threat without causing them to feel uncomfortable about sharing any private information. Through the questionnaire multiple option questions were provided avoid yes and no answers to help give a better idea about the subjects experiences and feelings on various questions. With each of the studied areas being similar size and population it meant that the amount of locals that could be asked would we similar giving amount for each area to improve the accuracy of the results. Before going out to each area it was decided that the questionnaire would be filled in by the person asking the question as it was much easier for them to ask the question and explain the various options individually reducing an confusion caused by members of the public being left to answer them on their own and also gives the researcher better control over how the responses are handed and can enquire further into interesting comments that are made which could lead to more useful information that would otherwise been missed. This would also always the questions to be asked in a less formal way by the researcher mean that a better relationship could be formed between the local resident and them. Also as the person being questioned is answer it was suggested that any answer given that the resident had add additional notes on to the end of would be noted down next to the appropriate question. After the 8 multiple option question have been

answered an additional comments box had been left at the bottom for any additional relevant information to be added such as person experiences while living in the area or just comments about what the member of the public remembered from previous flooding incidents etc. which would add an additional layer of insight into each person's individual views and thoughts on the topic of flooding and the level of threat they feel under.

Once the data had been collected it was categorised into the three separate locations of Littleborough, Hebden Bridge and Whitworth and then input into graphs to better show the similarities and contrasts of the different locations involved in the study as well as helping to highlight any anomalies in the data which could be singled out, also with the collection of additional comments at the end of each questionnaire these comments could help to better understands any outlying results in the data giving a better insight into the differences in opinion in each of the three communities. The data would be displayed in bar graphs separating the answers received from the different locations and contrast the results to consider if they line up with the hypothesis laid out at the beginning of this study.

chapter four : results and interpretation of data

The questionnaires that were filled out gave interesting results across them, with the wide demographics that were talked to it gave a much broader look at the different attitudes within the community as opposed to a single unified feeling felt by everyone living each of the areas. Before undertaking the questionnaires with the general public in each of the three areas it was expected that people coming from each area would be every similar in terms of their worries and concerns in regards to flooding where they lived. Looking at the results alone would not give much insight into the overall feeling of each group but thanks the additional comments received at the end of each questionnaire it can better shed some light on some of the differences in opinion and the crossover of getting similar answers from the different areas. In total 49 questionnaires were filled in, 22 of those were from Littleborough, 16 from Hebden bridge and 11 in Whitworth. This variation in the number of questionnaires filled out is due to a lack of interest in the latter two locations particularly I Whitworth which incidentally has the lowest population of the three villages and looking back this could have been expected prior to the study taking place. Looking at figure 4.1 this represent the amount of time that each of the participants has lived in the area for. The figure show that there is a high level of variation in the amount of time locals have lived in

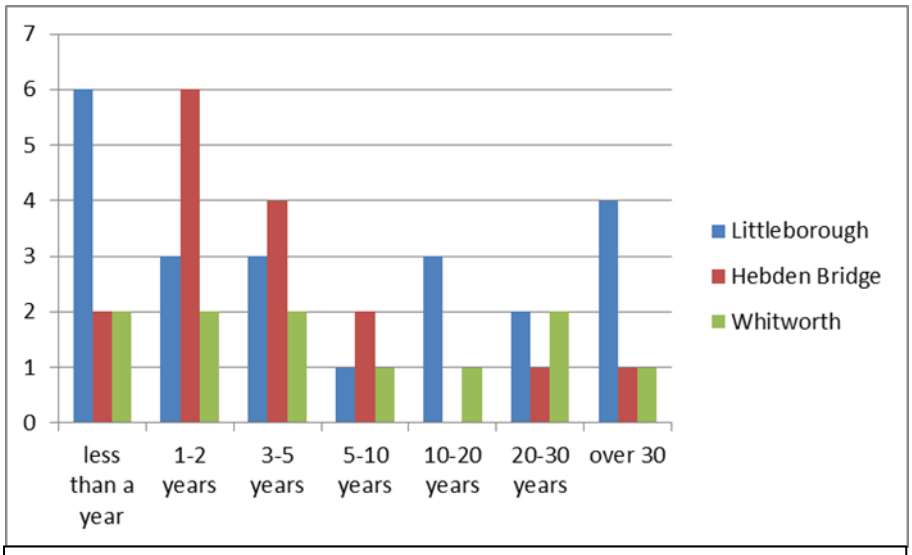

Figure 4.1 how long have the resident lived in the area

each of the areas. This suggests that the demographic for each village is a lot more diverse that was originally hypothesised at the beginning of this study what was original expected was that much more elderly and retired people would be in these areas as they may have lived there all their lives but seems to not be the case. This could be a result of these areas being used as satellite residential areas for the towns and cities close by. In the case of Littleborough and Whitworth they are only a forty minute drive to Manchester or alternatively twenty mine train ride whereas Hebden Bridge has trains going to Manchester, Leeds and York. This easily accessibility to major cities has resulted in the rapid expansion of Littleborough into almost a full sized town of its own in the last two decades with several new housing estates being built where the mills and factories of the area had been demolished to allow more room for residential areas. The next figure (4.2) shows the distance estimated by the subjects of how far away from the nearest river or tributary they were. This shows a definite trend in that the majority of people in all three locations live well within flooding distance of the main river running through the village or one of its major tributaries.

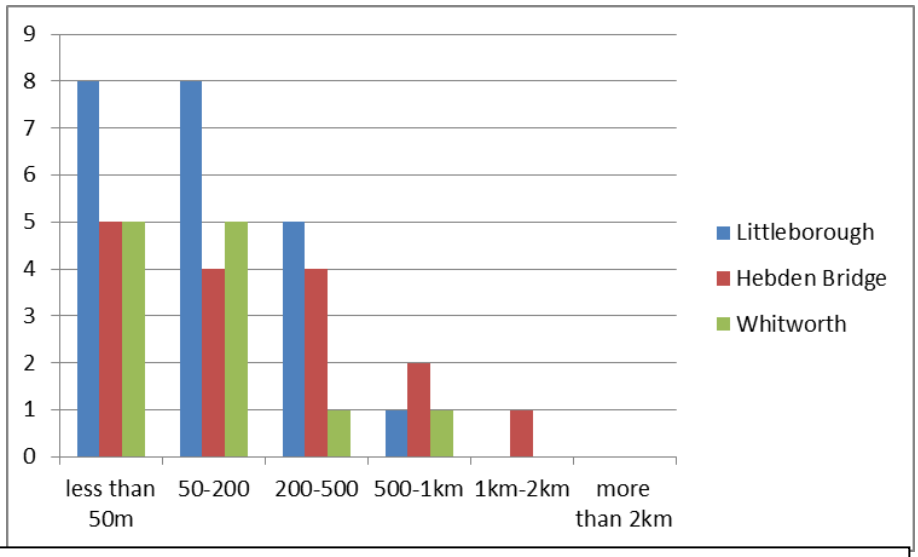

Figure 4.2 how far away would you estimate you live from the main river or tributary

Shown here in figure 4.3 it show on a scale of one to ten how at risk to flooding individuals felt their property was, even with Hebden bridge and Whitworth having lower amounts of data this clearly shows that those living in Hebden bridge

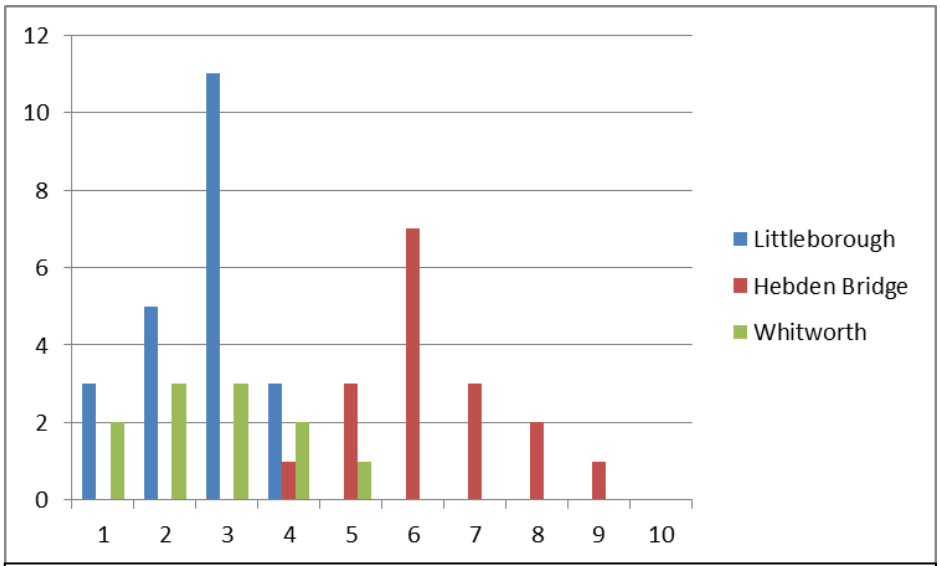

Figure 4.3 On a scale of 1-10 what level of risk do you consider your property is at?

where flooding is much more frequent consider it too be a much bigger threat. What is interesting about this is that residents from Whitworth are just as unconcerned as those living in Littleborough even though Littleborough has much better flood defences and Whitworth has previously have multiple flood warming in the past several years. What would be interest is to ask the same residents what their concerns were for flood risk after a flood event had occurred in or around the Whitworth area and compare it to this data. The 2 outlying numbers which are the score of four for Hebden Bridge and the five for Whitworth can be explain with the help of the additional comments from the questionnaires that were filled in, the Hebden anomaly was a resident that did not live in the centre of the village and was a great distance away from the main river and canal. They only considered the flooding to be an inconvenience for if they wanted to go into the village during severe weather conditions. As for the Whitworth anomaly this was someone who had been flooded previously when they had lived elsewhere and still considered it as threat to their home as they lived fairly close the river Spodden.

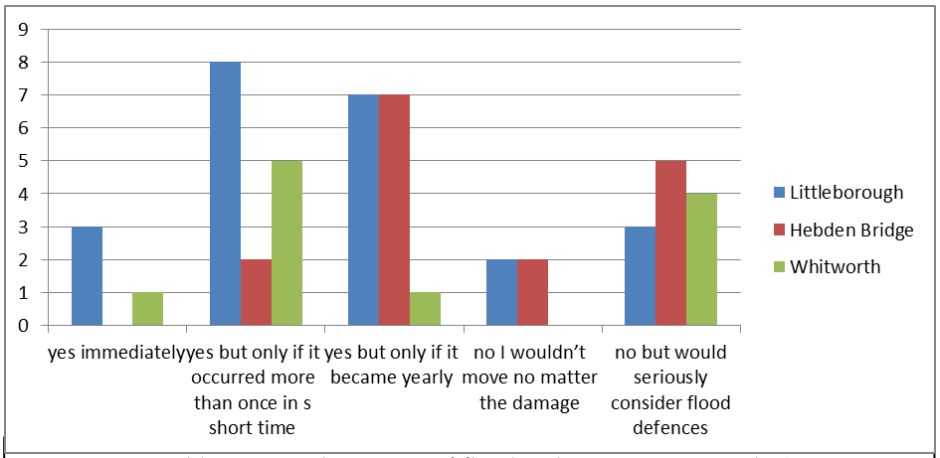

Figure 4.4 would you consider moving if flooding became more regular?

looking at figure 4.4 this shows the responses to the question "would you consider moving out of the area if flooding increased or became a regular occurrence that constant threaten your property" . The results from this are very surprising as very few people said they would move straight away and quiet and even percentage from each village said they wouldn't move and would just consider buying flood defences for their home. At the beginning of this study it would have seemed more like that more people would consider moving straight away at the prospect of constant threat of flooding over a prolonged period of time. This suggests that residents in these areas are more personally attached to both their homes and the place in which they live. Looking at the comments sections from the questionnaires some said that they wouldn't consider leaving because they had lived there all their lives and would seem pointless leaving now because it's started flooding a little more often.

Chapter five : Discussion

5.1 study limitations

In addition to the data already obtained there would have been a much better spread of opinions if there had been more data from the questionnaires, if this study was undertaken again an even amount of questionnaires from each village being used as a study area. Also a more even amount of residents that had been in the area for various amounts of time meaning that there were much more questionnaires filled in by elderly and retired people how are more likely to have lived in the area their whole lives giving a better perspective on how the area was outside of most residents memory. This would have given a much broader time scale to look at the changes that the flooding had gone through in the past several decades. This coupled with more younger or more people that have moved into the are more recently would have given a much better contrast as what it is like to live in the area now an what it was like prior to the changes in climate and the increase in flood events. Additionally the questionnaire would have been restructured to better question what it is like to live in the different areas, each village would have similar themed questionnaire but with individual question regarding knowledge of town previous flooding and also look at little closer at the insurance side of the flood risk and incorporate that more into the questionnaire while also trying not be too intrusive into the lives of those affected by flooding. This could be done by asking simple questions about whether they have a clear understanding of both insurance policy and building policy and contrast the different locations collective knowledge against one another. If this study was to be undertaken again I would also incorporate more of the hydrology side of things into it looking at the different channels at each location and the possibilities of reconstructing the banks of the various rivers with minimum damage or changes to the river natural features. The locations that were chosen also slightly limit the overall work, if more flexibility was possible it would have been better to have includes a catchment outside of the northwest area giving a much better contrast. Ideally it would have been somewhere such as Cockermouth were flooding occurred in 2009 on a massive scale this would give a similar scenario but on a much bigger scale as it was a much more urbanised area that was affected. Another alternative would have been to use a fourth study in the village of Todmorden which is the connecting village between Littleborough and

Hebden Bridge this area had been known to flood over 10 years ago but also had flood defences as Littleborough. However rather that deepening and straightening the river channel a large section of the park and playing fields next to the river just outside of Todmorden was lowered by around 2 metres to act as an overflow for the river. This works really well to help control the overflow of water but has had a devestationg effect on the fields as the grown level is too close to the water table to the football pitches are a constant quagmire and for most of the year unplayable on.

5.2 future works

Looking at the building, construction and planning permission side of flood prevention and protection would be the next step after this study. After reading through *planning policy guidance note 25: Development and flood risk* there seems to be a lot of guideline as to what you can build and were you can build it determined by a how often it is considered that it will flood. However it seem in the last five to ten years there would appear a higher risk in all areas that flooding is more likely to occur anywhere, it would seem rational then to look at plan permission and determine if the rules written over 12 years ago still apply today and if the boundaries have shifted in the last decade there needs to be a rapid update to where and what you can build on land that has the potential to flood regularly. Another area to branch out into off of this study would be to look at land use in rural areas, there is a lot of literature that is on land use in the inner city such as *Lots of parking: land use in car culture* which looks at the way cities and towns are being transformed by car culture and the same can be said for villages like Littleborough and Hebden Bridge. In villages that are just outside of major towns and cities houses are being built with enormous paved driveway causing massive increase in run off with the loss of small amounts of private green land everywhere. As well as this with more and more commuters living in these small villages which only have single lane roads with ten times the population of twenty years ago this is having a drastic effect on both the road and also causing micro congestion coming in and out of the villages. With thousands of people all trying to leave such a small space in such a short amount of time automatically jams up the roads in and out of the area. another direction this would be considered for this to go in is to look at climate extremes being caused and look at how the winters are getting colder and the summers appear to be getting warmer but also considerable wetter towards the end these changes are having a drastic effect on how we live and also the environment around us. With threats of hose pipe bans

during summers after having some of the wettest years on records previously the way that we store and distribute our water needs to be better maintained to help reduce to amount of water shortages. Other areas that would be looked into to explore would be flooding on a larger scale, such as when most of Gloucestershire was hit by intense rainfall for over a week leaving most of the area underwater for weeks before the last of the ground water was either pumped out or drain away naturally. This would be an interesting topic looking into the local people that were affected by it and still stayed in the area regardless of the risk of another flood event of a similar magnitude. This could also be used to look into the problem of flooding killing off an areas housing marked because of a single rare flood event and investigate how drastic the changes in house prices are after such a destructive flood event.

5.3 Conclusion

This investigation into how flooding in small communities effects the residents that live with the threat of flooding and the consequences of when it does inevitably flood people that have been hit by it previously such as in Hebden bridge are much more willing to simply weather the storm as it were rather than cutting their losses and leaving. Some of the people that answered the questionnaire who had only been living in the area for several years were more likely to leave where as those that were born in Hebden or simple lived there for the majority of their lives were more likely to want to stay for obvious reasons. In terms of the aims that were laid out and the hypothesises the amount of data obtained from the questionnaire there seemed to be a very wide range of different answers from each of the different villages in the study. The first hypothesis was produced under the idea that each of the different locations would have a similar sort of thought process when it comes to the threat of flooding in their area. looking back at the data it would appear that it depends more on how long you’ ve lived in and area rather than which area you live in in terms of how you perceive the level of threat flood evokes. If this study were to be undertaken again it would be considered to have a much larger group of individuals and categorise them not just from where the live but how long they’ ve lived there and contrast both age and location of residency. Hebden Bridge’ s Calderdale valley flooding will most likely continue to be a regular occurrence if the level of heavy precipitation becomes part of the British climate. This kind of unusually high rainfall is become less unusual and beginning to look more like a new step in the cycle of seasonal changes. The leave of after

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Appendix

Example questionnaire

Flood risk in small rural communities questionnaire.

1. Which area do you live in?
   Littleborough [ ]
   Whitworth [ ]
   Hebden Bridge [ ]

2. How long have you lived in the area?
   less than a year [ ] 1-2 year [ ] 3-5 years [ ] 5-10 years [ ]
   11-20 years [ ] 21-30 years [ ] more than 30 years [ ]

3. How far would you estimate you live from the main river or other tributary?
   Less than 50 metres [ ] 50 to 200 metres [ ] 201 to 500 metres [ ] 501m to 1km [ ] 1.1km to 2km [ ] more 2km [ ]

4. Has a flood event occurred while you have lived here? And if so how many and when did the last one occur? Yes [ ] No [ ]
   If yes how many.....

   And when was the last (please state the year and month if possible).....

5. How concerned are you about the risk of a flood event will occur in the local area?

   Not concerned [ ]

   aware that one may occur but will like not affect you [ ]

   worried that one will happen but will like not affect you [ ]

   concerned that one will occur and many cause minor inconveniences [ ]

   worried that one will occur and having seen the damage it has caused you are concerned for you property [ ]

   you have been flooded previously and are very worried that it will happen again in the near future [ ]

6. Did you consider the risk of flooding as a factor when moving into this area?

   yes it was a concern but didn't look into it [ ]

   was not a concern but has become one due to recent floods [ ]

   was not a concern at all [ ]

   was a concern and was looked into before moving [ ]

7. On a scale of one to ten, one being the lowest and ten the highest would you consider flooding the largest threat or risk to your property.

   .....

8. Would you consider moving out of the area if flooding increase or became an regular occurrence that constant threaten your property?

   Yes I would consider it immediately [ ]

   Yes but only if it occurred more than once within a short period of time [ ]

   Yes but it would have had to occur several times on a yearly basis [ ]

   No I would move no matter the damage [ ]

   No but I would consider investing in flood defences [ ]

9. Additional comments.

Application for safety and ethical approval for all projects

School of Built and Natural Environment

All undergraduate, postgraduate, commercial and research projects need ethical approval. No field work, experimentation or work with participants can start until approval is granted. The questions below should be completed by the Principal Investigator or supervisor of the proposed project. Where projects involve students, the Principal Investigator is always the supervisor and never the student.

For **undergraduate** and **postgraduate taught** projects: use the questions to identify whether the project should be referred to the relevant Ethics Committee.

- If you answer "No" to questions, then do not apply for approval.
- If you answer "Yes" to **any** of the questions, please discuss them with your supervisor. If your supervisor is confident that you can follow standard forms, protocols or approaches, then your supervisor can approve your application. If your supervisor is not, then the application should be sent for approval.

For **research, commercial and other** projects: use the questions to help compile suitable evidence to support your application.

- If you answer "No" to questions, then your application is likely to be approved quickly.
- If you answer "Yes" to **any** of the questions, please provide evidence relating to the management of the activity. If your approach seems appropriate, then your application is likely to be approved quickly.

Submit the application form and any supporting evidence to an appropriate Ethics Committee. Different committees might have different approval processes.

Principal Investigators, or project supervisors, are responsible for ensuring that all activities fall within the principles set down in the University Code of Conduct for Research and the University Ethical Principles for Teaching, Research, Knowledge Transfer, Consultancy and Related Activities. They are also responsible for exercising appropriate professional judgment in undertaking this review and evaluating the activity according to the criteria laid down in this application. If you are uncertain about any sections of this document, or need further information and guidance, please consult a member of the relevant School Ethics Committee.

TheSchool Ethics and Safety Committees are to ensure that you comply with the University's ethical principles in the conduct of the activity. Committees can ask for clarification or set conditions for you to meet before approval is granted.

Expiry and review: The principal investigator is responsible for ensuring activities are reviewed. Normally:

- each year: review risk assessments: check for changes to hazards and training refreshers
- after 5 years: review ethics: check for new laws, practices
- closure: dispose of materials and sensitive data properly

Refer to the relevant documents from the following links:

1. Ethical Principles for Research, Consultancy, Practical Work and Related Activities
2. Research Governance (Multiple documents)
3. Health, Safety & Environment (Multiple documents)

1 Project synopsis

Approver: Cmte number:

1.1 Title	The environmental and social effects of water shortages and drought									
1.2 Project type	Original research		Research degree		PG taught		UG taught		Commercial	
1.3 Short description in layman's terms [no acronyms or jargon]	This research will investigate what effect school based environmental education packages have on students and their families. To achieve this a mixed methodology will be used combining interviews, focus groups, and questionnaires.									
1.4 Dates	Start may 2012		End April 2013							
1.5 School of …..	Built and Natural Environment									

2 Participants

2.1 Project supervisor /principal investigator: name, position and original signature	Project Supervisor : Mike Clark Principle investigator : Chris Schofield
2.2 Co-workers: names and positions [eg student]	Sam Sallwork : student (will be assisting with questionnaires while with the public)

3 External collaborators
3.1 List external collaborating bodies
3.2 Provide evidence of any ethical approvals obtained [or needed] by external collaborators
3.3 Indicate whether confidentiality agreements have been or will be completed

Read any associated procedures and guidance or follow any associated checklist, and delete, Yes or No, for each characteristic in A) to F) below.

If you respond **No**, then in your judgment you believe that the characteristic is irrelevant to the activity.

If you respond **Yes**, then you should **provide relevant documentation** [including risk assessments] with the application, and cross-reference to it, eg A2 or B9. **Use reference numbers of standard** forms, protocols and approaches and risk assessments where they exist.

A) Does the activity involve field work or travel to unfamiliar places? If Yes: 1. Does the activity involve field work or leaving the campus [eg overseas]? 2. Does the field work involve a 'party' of participants or lone working ? 3. Does the activity involve children visiting from schools?	A) Yes 1. Yes 2. both 3. No
B) Does the activity involve humans other than the investigators? If Yes: 1. Will the activity involve any external organisation for which separate and specific ethics clearance is required (e.g. NHS; school; any criminal justice agencies including the Police, CPS, Prison Service)? – start this now [CRB clearance process at Loughborough; Uclan contact Carole Knight] 2. Does the activity involve participants who are unable to give their informed consent (e.g. children, people with severe learning disabilities, unconscious patients etc.) or who may not be able to give valid consent (e.g. people experiencing mental health difficulties)?	B) Yes 1. No 2. No 3. Yes

3. Does the activity require participants to give informed consent? [consent guidance at City U] 4. Does the activity raise issues involving the potential abuse or misuse of power and authority which might compromise the validity of participants' consent (e.g. relationships of line management or training)? 5. Is there a potential risk arising from the project of physical, social, emotional or psychological harm to the researchers or participants? 6. Does the activity involve the researchers and/or participants in the potential disclosure of any information relating to illegal activities; the observation of illegal activities; or the possession, viewing or storage (whether in hard copy of electronic format) which may be illegal? 7. Will deception of the participant be necessary during the activity? 8. Does the activity (e.g. art) aim to shock or offend? 9. Will the activity involve invasion of privacy or access to confidential information about people without their permission? 10. Does the activity involve medical research with humans, clinical trials or use human tissue samples or body fluids? 11. Does the activity involve excavation and study of human remains?	4. No 5. No No 6. No 7. No 8. No 9. No 10. No
C) Does the activity involve animals and other forms of life? If Yes: 1. Does the activity involve scientific procedures being applied to a vertebrate animal (other than humans) or an octopus? 2. Does the activity involve work with micro-organisms? 3. Does the activity involve genetic modification? 4. Does the activity involve collection of rare plants?	C) No 1. No 2. No 3. No 4. No
D) Does the activity involve data about human subjects? If Yes: 1. After using the data protection compliance checklist, have you any data protection requirements? 2. After answering the data protection security processing questions, have you any security requirements? [Data storage] [keep raw data for 5 years]	D) Yes 1. Yes 2. Yes
E) Does the activity involve hazardous substances? If Yes: 1. Does the activity involve substances injurious to human or animal health or to the environment? Substances must be disposed properly. 2. Does the activity involve igniting, exploding, heating or freezing substances?	E) No 1. 2.
F) Other activities: 1. Does the activity relate to military equipment, weapons or the Defence Industry? 2. Are you aware of any ethical concerns about the company/ organisation, e.g. its product has a harmful effect on humans, animals or the environment; it has a record of supporting repressive regimes; does it have ethical practices for its workers and for the safe disposal of products?	F) 1. No 2.
Note: in all cases funding should not be accepted from tobacco-related industries	

If you respond **Yes**, then you should **provide relevant documentation** [including risk assessments] with the application, and cross-reference to it, eg A2 or B9. **Use reference numbers of standard** forms, protocols and approaches and risk assessments where they exist.

These standard forms are being followed [cross reference to the characteristic, eg A2]:

A1,A2 and A3: a risk assessment has been filled in and all work outdoors will be done with a team of 2 at all times with appropriate equipment, the ability to contact someone in case of injury or other problems and several friends of family members will be informed of our whereabouts and the likely time of us returning with a later time given to contact the authorities if we are missing and unable to be contacted after this time.

B3: asking that the participant is fine with me recording all answers and if they would like to stop at any time they can.

D1 and D2: all data collected in response to questionnaires, focus group and companies contacted all information will be stored safely on a password protected folder on an encrypted hard drive which will be deleted directly after all results have been analysed. As well as all information provide to me will be completely confidential and in no way will it be traceable back to them.

Health, Safety and Environment Section

RISK ASSESSMENT FORM

Risk Assessment For
Service / Faculty / Dept: SBNE
Location of Activity: Littleborough village centre, Hebden Bridge village square and Whitworth area.
Activity: Asking the general public (specifically residents of the area) a pre-printed questionnaire on flooding in the area **REF:**

Assessment Undertaken By
Name: Chris Schofield
Date:
Signed by Head of Dept / equivalent
Date

Assessment Reviewed
Name:
Date:

List significant hazards here:	**List groups of people who are at risk:**	**List existing controls, or refer to safety procedures etc.**	**For risks, which are not adequately controlled, list the action needed.**	**Remaining level of risk: high, med or low**
Possibility of interviewer become aggressive	**Chris Schofield and group**	Staying a well-lit public place with another person	**none**	**low**

Crossing roads to arrive at study sites	**Chris schofield and group**	Using crossing where ever possible and keeping to available pavements, avoiding traveling to sights after dark but if necessary the group will where high visibility clothing	**none**	**low**
Getting lost or being injure while out collecting data	**Chris schofield**	Informing 2 people of where I am and what time I should be back as well as constantly having my mobile phone with me	**none**	**low**
Being attacked or assaulted while trying to fill in questionnaires	**Chris schofield and group**	Only asking people to answer the questionnaires in a safe controlled environment such as the heritage centre in littleborough and also only doing this during day light	**none**	**low**