SOCIAL AND POLITICAL DYNAMICS
OF FLOOD RISK, RECOVERY AND RESPONSE
SUPPLEMENTARY MATERIALS

# Social and Political Dynamics of Flood Risk, Recovery and Response: A Report on the Findings of the Winter Floods Project Supplementary Materials

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# Section A: Extended Methodology

## PHASE ONE: QUALITATIVE – SOMERSET LEVELS AND MOORS

The longitudinal design of the qualitative phase allowed the evolution of views and experiences over time to be examined as the recovery from the 2013/14 winter floods progressed.

Recruitment of public participants was initiated though the delivery of information packs to households across affected villages within the Somerset Levels and Moors. Individuals who wanted to take part in the study were requested to return an expression of interest form with questions about flood experience in a freepost envelope that was included with the information pack.   In order to fully capture the range of experiences resulting from the winter flood events, our participants included those who had been directly flooded (i.e. with water entering their homes, land or business) and who had been indirectly affected (e.g. having difficulties getting to work) (see *Table A-1*).

In recruiting the stakeholder cohort, the project team approached existing contacts within national agencies such as the Environment Agency, that have a professional responsibility for flood risk management. Additionally, new relationships were formed with key actors within Somerset, which gave rise to further participants. Finally, the snowball technique was used to recruit new participants recommended to the project team by existing participants.

The recordings were transcribed and the data anonymised such that the participants identity could not be revealed from the transcripts.  The transcripts were thematically coded using Computer Aided Qualitative Data Analysis Software (Nvivo10). Thematic coding is a technique widely used in qualitative data analysis, with the themes being iteratively refined from the data itself and the wider literature on the topic. In the analysis, participants are differentiated using participant numbers (or pseudonyms).

## PHASE TWO: QUANTITATIVE – SOMERSET AND LINCOLNSHIRE

The sample for the telephone survey (n=1000) was equally split between Lincolnshire and Somerset, and focussed on sub-sections of the two areas that had been flooded during 2013/14. The survey was administered through a market research company who used landline and mobile telephone numbers to call individuals in the survey area and invite them to take part.

A quota approach to sampling was utilised to ensure a broadly representative sample in terms of age and gender. The survey remained active until the quotas in each area had been filled. Figure 1 compares flood experience between Somerset and Lincolnshire.

*Table A-1:* Demographic details of Boston and Somerset sub-samples of survey.

| Gender | |
|---|---|
| Male | 17 |
| Female | 18 |
| **Age** | |
| 18-24 | 1 |
| 25-34 | 2 |
| 35-44 | 1 |
| 45-54 | 5 |
| 55-64 | 9 |
| 64+ | 16 |
| *Not Answered* | *1* |
| **2013/14 Flood Experience** | |
| Direct (i.e. flooded in home or land) | 3 |
| Indirect (e.g. difficulty travelling to work) | 15 |
| Both | 15 |
| *Not Answered* | *2* |
| **Previous Flood Experience** | |
| Flooded Previously | 6 |
| Not Flooded Previously | 16 |
| *Not Answered* | *13* |
| **Accommodation Type** | |
| Own/rent privately | 24 |
| Rent socially | 2 |
| *Not Answered* | *9* |
| **Accommodation Situation** | |
| Alone | 5 |
| With partner/spouse | 22 |
| With partner/spouse and children | 6 |
| With children | 2 |
| **Employment Status** | |
| Employed | 8 |
| Self-Employed | 8 |
| Retired | 19 |
| Homemaker | 2 |
| Student | 1 |

Table A-2: Demographic details of Boston and Somerset sub-samples.
Three demographic variables (*) showed significant differences between the Somerset and Boston samples, using Kolmorgorov-Smirnov tests: 1. Highest Educational Achievement (Z = 1.472, p = .026); 2. Household Income (Z = 2.520, p < .001), and 3. Time Resident in Area (Z = 1.598, p = .012)

|  | Somerset | Boston | Total |
|---|---|---|---|
| **Gender** | | | |
| Male | 257 | 231 | 488 |
| Female | 243 | 269 | 512 |
| *Not Answered* | 0 | 0 | 0 |
| **Age Band** | | | |
| Aged 18 to 24 | 30 | 22 | 52 |
| Aged 25 to 34 | 52 | 40 | 92 |
| Aged 35 to 44 | 90 | 72 | 162 |
| Aged 45 to 54 | 100 | 116 | 216 |
| Aged 55 to 64 | 95 | 107 | 202 |
| Aged 65 to 74 | 88 | 92 | 180 |
| Aged 75 or over | 45 | 51 | 96 |
| *Not Answered* | 0 | 0 | 0 |
| **Employment Status** | | | |
| An employee in a full time job (31 hours or more per week) | 177 | 161 | 338 |
| An employee in a part time job (Less than 31 hours per week) | 69 | 80 | 149 |
| Self-Employed (full or part-time) | 69 | 44 | 113 |
| In full time education at school, college or university | 8 | 12 | 20 |
| Unemployed and available for work | 9 | 19 | 28 |
| Permanently sick or disabled | 4 | 11 | 15 |
| Wholly retired from work | 145 | 158 | 303 |
| Looking after the home | 17 | 12 | 29 |
| Doing something else (please specify) | 2 | 2 | 4 |
| *Not Answered* | 0 | 1 | 1 |
| **Accommodation Situation** | | | |
| Owned with a mortgage or loan | 178 | 163 | 341 |
| Owned outright | 221 | 222 | 443 |
| Other owned | 0 | 2 | 2 |
| Rented from Council | 14 | 12 | 26 |
| Rented from a Housing Association or another Registered Social Landlord | 17 | 40 | 57 |
| Rented from a private landlord | 46 | 37 | 83 |
| Other rented or living here rent free | 1 | 0 | 1 |
| Part rent and part mortgage (shared ownership) | 2 | 2 | 4 |
| *Not Answered* | 21 | 22 | 43 |

| | Somerset | Boston | Total |
|---|---|---|---|
| **Number of adults in household** | | | |
| One | 106 | 117 | 223 |
| Two | 269 | 264 | 533 |
| Three | 77 | 76 | 153 |
| Four | 36 | 27 | 63 |
| Five | 3 | 4 | 7 |
| Six | 2 | 1 | 3 |
| Seven | 1 | 0 | 1 |
| Don't know | 0 | 2 | 2 |
| *Not Answered* | 6 | 9 | 15 |
| **Number of children in household** | | | |
| None | 348 | 367 | 715 |
| One | 61 | 60 | 121 |
| Two | 61 | 48 | 109 |
| Three | 20 | 11 | 31 |
| Four | 3 | 4 | 7 |
| Don't know | 0 | 1 | 1 |
| *Not Answered* | 7 | 9 | 16 |
| **Highest Educational Achievement*** | | | |
| GCSE/O-level/CSE or equivalent | 81 | 117 | 198 |
| Vocational quals (=NVQ1+2) or equivalent | 31 | 37 | 68 |
| A level or equivalent (=NVQ3) or equivalent | 130 | 100 | 230 |
| Bachelor Degree or equivalent (=NVQ4) or equivalent | 161 | 112 | 273 |
| Masters/PhD or equivalent | 32 | 21 | 53 |
| No formal qualifications | 40 | 77 | 117 |
| *Not Answered* | 25 | 36 | 61 |
| **Gross Household Income*** | | | |
| Less than £15,000 | 29 | 51 | 80 |
| £15,000 but less than £20,000 | 16 | 23 | 39 |
| £20,000 but less than £30,000 | 54 | 51 | 105 |
| £30,000 but less than £45,000 | 52 | 77 | 129 |
| £45,000 but less than £60,000 | 49 | 19 | 68 |
| £60,000 or more | 62 | 32 | 94 |
| *Not Answered* | 238 | 247 | 485 |
| **Length of time in area*** | | | |
| Less than 12 months | 6 | 2 | 8 |
| 12 months but less than 5 years | 50 | 32 | 82 |
| 5 years but less than 10 years | 62 | 55 | 117 |
| 10 years but less than 20 years | 104 | 83 | 187 |
| 20 years or more | 275 | 326 | 601 |
| *Not Answered* | 3 | 2 | 5 |

*Figure A-1: Responses from surveys questions about personal experience of floods, and the experience of individuals and the community during the 2013/14 winter floods.*
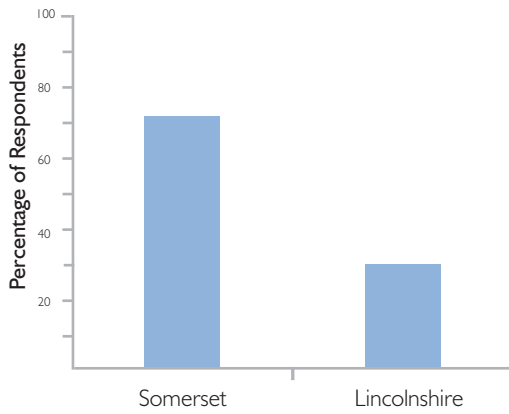


Q: Numbers of respondents, split by region, who answered yes to the question 'Have you personally experienced some impact from flooding, either direct (e.g. flooding in home) or indirect (e.g. difficulties getting to work)?
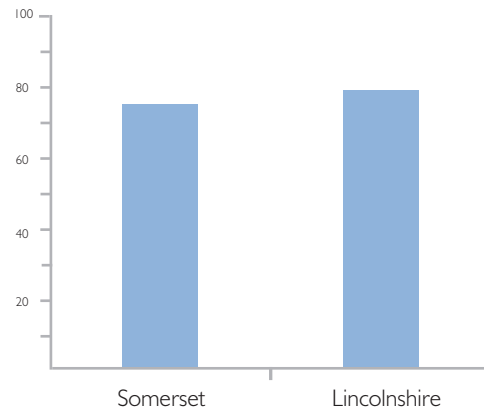
Q: Number of respondents, split by region, who answered yes to the question 'Were you or your community affected by the 2013/14 winter floods?

The survey lasted approximately 20 minutes and asked participants about their flood experiences, their views on the causes of the floods, the impacts of the floods on their well-being in the present day and at three historic time points, their views about levels of social capital in their community (adapted from Poortinga, 2006[1]), and attitudes towards the role of the community and governing institutions during the floods. The survey finished with a selection of standard demographic questions (see Table A-1) that showed three key differences across the sample.

The first is that fewer respondents from Boston had incomes above £45,000 when compared to Somerset (Kolmogorov-Smirnov: $Z = 1.472$, $p = 0.026$). The second was that respondents from Somerset tended to have higher educational achievements when compared to Boston. Third, the length of time resident in the area was different, with more people living in Boston for more than 20 years, but fewer people from Boston living in the area for less than 20 years when compared with respondents from Somerset.

[1] POORTINGA, W. 2006. Social relations or social capital? Individual and community health effects of bonding social capital. Social Science and Medicine, 63, 255-270.

# Section B: In-depth Data Analysis

The resultant data was analysed in SPSS 23 using a combination of parametric and non-parametric approaches.

**Community Social Capital Scales**

We used two scales to assess community social capital: The two scales were called Community Cohesion and Community Acceptance. these were measures used to assess perceptions of community social capital (specifically bonding and bridging capital, see Poortinga 2006) and consisted of five items covering trust, reciprocity and belonging (see table B-1). The Community Cohesion scale measured levels of trust in the community and respect for difference. The Community Acceptance scale measured whether the community pulls together and feelings of belonging.

*Table B-1: Results from Principle Components Analysis on community social capital questions. The questions were 5-point Likert scale items, where 1 = strongly agree and 5 = strongly disagree.*

*Component 1 was called Community Cohesion and this scale which measures perceptions of trust within the community and respect for differences. Component 2 was termed Community Acceptance and this scale measures perceptions about whether the community pull together and feelings of belonging.*

| | COMPONENT | | | | |
| | 1 | 2 | Agree (%) | Neither Agree nor Disagree (%) | Disagree (%) |
|---|---|---|---|---|---|
| To what extent do you agree or disagree that in your local community, people from different backgrounds get on well together? | **.884** | .206 | 62.8 | 10.1 | 27.1 |
| To what extent do you agree or disagree that your local community is a place where residents respect differences between each other. | **.875** | .205 | 66.8 | 10.7 | 22.5 |
| To what extent do you agree or disagree that the majority of people in your local community can be trusted? | **.605** | .552 | 73.9 | 11.3 | 14.8 |
| To what extent do you agree or disagree that people in your local community pull together to improve the community? | .097 | **.890** | 78.1 | 10.9 | 10.9 |
| To what extent do you agree or disagree that you feel that you belong strongly to your local community? | .412 | **.701** | 74.3 | 9.4 | 16.3 |
| Cronbach's α | .74 | .82 | | | |

## SUBJECTIVE WELL-BEING ASSESSMENT

Participants were asked to grade their well-being at four distinct time periods, on a scale of 0 to 10, with 0 being low and 10 being high. Participants were first given the following definition of well-being: "Well-being can be defined as judging life positively and feeling good" (CDC, 2015) and then asked to rate their well-being that day, before the floods, during the floods and 12 months post flooding. The scores were used as a continuous variable in correlation analysis (see *Table B-2*) and comparison of mean tests (ANOVA and matched pair t-tests). We found no influence of gender of income of well-being.

*Table B-2*: *Pearsons, correlations coefficients between the two community scales and the four well-being assessments – (a) flood affected; (b) not flood affected. In the survey, all participants were asked about their present day wellbeing; only those participants who had earlier indicated that they or their community were impacted by the 2013/14 floods were asked about their well-being at the three earlier time points. The two community social capital scale questions were 5-point Likert scale items, where 1 = strongly agree and 5 = strongly disagree (see Table B-1 above).*

*The community acceptance scale measured whether the community pulls together and feelings of belonging to the community. The community cohesion scale measured levels of trust in the community and respect for differences.*

*\* p<=0.05      \*\*p<=0.01      \*\*\*p<=0.001*

| (a) | Wellbeing Scores (0 = low, 10 = high) | | | |
|---|---|---|---|---|
| | Present Day | 12 months post flood | During flood | Prior to flood event |
| Community Acceptance | r(529) = -.180*** | r(469) = -.112* | r(471) = -.059 | r(471) = -.076 |
| Community Cohesion | r(517) = -.145*** | r(457) = -.129** | r(459) = -.092* | r(459) = -.105* |

| (b) | Wellbeing Scores (0 = low, 10 = high) | | | |
|---|---|---|---|---|
| | Present Day | 12 months post flood | During flood | Prior to flood event |
| Community Acceptance | r(434) = -.171*** | r(253) = -.196** | r(249) = -.020 | r(253) = -.359** |
| Community Cohesiveness | r(433) = -.157*** | r(256) = -.125* | r(252) = -.037 | r(251) = -.269*** |

In order to identify which factors contribute to well-being 12 months post flood event, a stepwise multiple regression was conducted. The dependant variable was self reported well-being 12 months post flood, and independent variable were the community scales (see table B-1), self reported well-being during the flood event, the responses to the eight community questions (see Table B-4), and the response to the questions about social justice (see Table B-5), socio-demographic variables (for example gender, income, highest educational achievement), flood experience (i.e. affected by flooding or not) and evacuation.

*Table B-3*: Stepwise multiple regression analysis, independent variable is wellbeing 12 months post flood.

| | b | SE b | β |
|---|---|---|---|
| **STEP 1** | | | |
| Constant | 6.76 | .26 | |
| Well-being during flood event | 0.31 | .04 | .40*** |
| **STEP 2** | | | |
| Constant | 7.63 | .33 | |
| Well-being during flood event | 0.30 | .04 | .39*** |
| Community Acceptance scale | -0.44 | .11 | -.20*** |
| **STEP 3** | | | |
| Constant | 7.06 | .37 | |
| Well-being during flood event | 0.28 | .04 | .37*** |
| Community Acceptance scale | -0.40 | .11 | -.18*** |
| The recovery was more stressful than the flooding itself | 0.22 | .07 | .16*** |
| **STEP 4** | | | |
| Constant | 7.55 | .44 | |
| Well-being during flood event | 0.26 | .04 | .35*** |
| Community Acceptance scale | -0.39 | .11 | -.18*** |
| The recovery was more stressful than the flooding itself | 0.21 | .07 | .15*** |
| The authorities did all that they could to help the public after the flood. | -0.13 | .07 | -.10* |

*Note:* $R^2 = .16$ for Step 1 (p<0.001), $\Delta R^2 = .23$ for Step 4 (p<0.001)
$\Delta R^2 = .04$ for Step 2 1 (p<0.001), $\Delta R^2 = .02$ for Step 3 (p<0.001).
* p<0.05; ***p<0.001

*Table B-4*: Responses to the eight community questions in the survey. Only those participants who had earlier indicating that either they or their community were impacted by the 2013/14 floods were asked these questions in the survey.

*p<=0.05     **p<=0.01     ***p<=0.001

| To what extent do you agree or disagree? | | Flood Experience | Agree (%) | Neither Agree nor Disagree (%) | Disagree (%) |
|---|---|---|---|---|---|
| That the community spirit made it easier to cope with the flooding? | t(743) = -.476 | Flood Affected | 83 | 11 | 6 |
| | | Not Flood Affected | 86 | 7 | 7 |
| That the local community provided support that was not available from the authorities (e.g. government bodies, fire service, Environment Agency)? | t(729) = -2.877** | Flood Affected | 87 | 7 | 6 |
| | | Not Flood Affected | 81 | 10 | 9 |
| That the floods have caused divisions in your local community, for example between those who were flooded and those who were not? | t(730) = -1.581 | Flood Affected | 21 | 9 | 70 |
| | | Not Flood Affected | 18 | 10 | 72 |
| That the evacuation of your community meant that communication and support during the floods was not available from your community? | t(593) = -1.430 | Flood Affected | 30 | 20 | 50 |
| | | Not Flood Affected | 24 | 18 | 59 |
| That support workers in your community have been really important in helping your community recover from the floods? | t(562.865) = 2.981** | Flood Affected | 65 | 17 | 18 |
| | | Not Flood Affected | 77 | 12 | 11 |
| That the recovery process has been more stressful than the flooding itself? | t(575.100) = 4.857*** | Flood Affected | 52 | 14 | 34 |
| | | Not Flood Affected | 71 | 10 | 19 |
| that you are confident that the flood defense works that have been put in place will protect you in the event of another flood? | t(734) = .768 | Flood Affected | 44 | 14 | 42 |
| | | Not Flood Affected | 45 | 15 | 40 |

*Table B-5*: *Responses to the five social justice questions in the survey.*

*Only those participants who had earlier indicated that they or their community were impacted by the 2013/14 floods were asked all six questions in the survey. If participants indicated that they were not personally affected but were aware of the floods, they were asked the last three questions. If participants indicated that they were not affected by the 2013/14 floods and were not aware of the floods, then they were not asked these questions.*

$* p <= 0.05$    $** p <= 0.01$    $*** p <= 0.001$

| To what extent do you agree or disagree? | | Flood Experience | Agree (%) | Neither Agree nor Disagree (%) | Disagree (%) |
|---|---|---|---|---|---|
| My local community received help promptly following the flood | $t(583.416) = 2.961***$ | Flood Affected | 39.5 | 13.5 | 46.9 |
| | | Not Flood Affected | 57.1 | 11.7 | 31.1 |
| Other regions in the UK got more help than you did? | $t(802.339) = 1.766$ | Flood Affected | 42.2 | 24.9 | 32.9 |
| | | Not Flood Affected | 40.2 | 28.5 | 31.2 |
| The authorities did all that they could to help the public after the flood | $t(954.789 = 24.575***$ | Flood Affected | 52.2 | 8.9 | 39.0 |
| | | Not Flood Affected | 65.4 | 9.9 | 26.7 |
| You feel that resources were distributed to those who needed them most | $t(903.520 = 6.552***$ | Flood Affected | 56 | 10.5 | 33.5 |
| | | Not Flood Affected | 65.4 | 10.6 | 24.0 |
| You do not have much trust that the authorities would be able to deal with a similar event in the future | $t(560.618) = 0.086$ | Flood Affected | 48.3 | 7.0 | 64.7 |
| | | Not Flood Affected | 46.9 | 11.4 | 41.8 |

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