How should society choose where to direct flood resources?

Philippa King, LCP
Neil Chapman, Willis Towers Watson
IFoA Flood Working Party

06 June 2016
Overview

Impact of flood

The insurance industry

Flood defences

Outlook

06 June 2016
Impact of flood
Impact of flood
Impact of flood
Impact of flood
Impact of Flood: Europe 2000 - 2016

Flood Events: 268

People displaced: >1m

Fatalities: 1296

Insured losses: >€62bn

Losses insured: 30%

Impact of Flood UK: Christmas 2015

Number of claims: 22,000

Families displaced: >3,600

Insured losses: £1.5bn

Total losses: £5bn

Avg household claim: £50k

Impact of Flood UK: Christmas 2015

22,000

>3,600

£1.5bn

£5bn

£50k

How do we get it right?

Uninsured flood victims facing billion-pound bill

Floods swamp £48m defences

Fury at flood fatcat bonuses

DAM YOU, CAM

Why bother with flood defences? My insurance will cover it!

New flood insurance scheme to cut bills by hundreds of pounds

Institute and Faculty of Actuaries

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The insurance industry
Flood insurance obligations

Voluntary vs. mandatory
- Mandatory offer (insurers)
- Mandatory purchase (policy holders)
- Mandatory purchase and offer
- Mandatory and voluntary purchase
- Voluntary

LEGEND

upenn.maps.arcgis.com/apps/MapSeries/?appid=4fa76ed45f9f4ee5a5995c0ea7ae6f3
Flood policies single vs bundled
Government in flood insurance
What is Flood Re?

Homes built after 2009
Commercial properties
Buy to lets
How does Flood Re work?

High risk homes: 1-2% highest risk, ~350,000
How does Flood Re work?

High risk homes: 1-2% highest risk, ~350,000
## Flood Re considerations

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Issues</th>
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</tbody>
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06 June 2016
Flood Defences
Flood defence and response methods

Flood Prevention
- vegetation
- sea walls
- self-closing barriers
- barriers
- water gate
- resilient repairs

Flood response
- house defences
- emergency services
- alternative accommodation
- protective clothing
- boats
- equipment
- ropes
- animal cages
- insurance
- evaluating lessons learned

(not) dredging rivers (?)
Case study: Thames flooding

- Option 1: Divert water from river in times of flood
- Option 2: Flood proof homes
## Cost-benefit analysis – divert water

<table>
<thead>
<tr>
<th>Cost</th>
<th>Benefit</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Construction</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scheme</td>
<td>Selling minerals from dredging</td>
<td>£5m</td>
</tr>
<tr>
<td>Transport disruption</td>
<td></td>
<td>- £155m</td>
</tr>
<tr>
<td>Maintenance</td>
<td>Commercial properties protected</td>
<td>£80m (+)</td>
</tr>
<tr>
<td>Maintenance</td>
<td></td>
<td></td>
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<tr>
<td><strong>Economic</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maintenance</td>
<td>Parks, boating facilities, wildlife reserves, fish</td>
<td>- £5m (+)</td>
</tr>
<tr>
<td><strong>Environmental</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Downstream flooding (affects 20,000 people)</td>
<td>Four floods prevented</td>
<td>+ £60m</td>
</tr>
<tr>
<td>Reduced property</td>
<td>Property values increase</td>
<td>£50m (+)</td>
</tr>
<tr>
<td><strong>Social</strong></td>
<td></td>
<td></td>
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<td>Property values increase</td>
<td>£50m (+)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>£335m + social</td>
</tr>
</tbody>
</table>

Assumptions: Costing over 65 years
Scheme prevents 4 major floods in that time

http://geography.org.uk/resources/flooding/2014ukfloods/
Cost-benefit analysis – flood proof homes

<table>
<thead>
<tr>
<th>Construction</th>
<th>Economic</th>
<th>Environmental</th>
<th>Social</th>
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</thead>
<tbody>
<tr>
<td>3,000 homes</td>
<td>£20,000 per home</td>
<td>£60m</td>
<td>70% reduction of repair costs</td>
</tr>
<tr>
<td>£60m</td>
<td>- £60m</td>
<td></td>
<td>£140m</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>+ £140m</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- social</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>+ £80m</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>social</td>
</tr>
</tbody>
</table>

Assumptions: Assumes 4 major floods over 65 years
Ignores downstream homes

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Decision time…

- Option 1: Divert river
  - £160m cost to government
  - £20m net cost + social benefit

- Option 2: Flood proof homes
  - £230m cost
  - £60m cost to government
  - £80m net benefit + social cost

Actual benefit:
- £230m

Cost of extension:
- £256m

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http://www.bbc.co.uk/news/uk-england-berkshire-25727040
Limited resources

• 8 to 1 ratio of return on flood spending
Flood Defences – EU directive

2011

Preliminary flood risk assessment

2013

Flood risk maps for these zones

2015

Flood risk management plans:
Prevention, protection and preparedness

2016

Overview report based on members’ flood risk management plans

http://ec.europa.eu/environment/water/flood_risk/

06 June 2016
Netherlands

• Tens of billions of euros over 40 years
• €1bn per year maintenance
Outlook
Funding increase

- Budget 2016 – IPT increased from 9.5% to 10%
National flood resilience review

- Modelling
- Resilience of infrastructure
- Temporary defences
- Investment strategy

Flood Re transition plan

Transitioning to an affordable market for household flood insurance

The first Flood Re transition plan

February 2016

http://www.floodre.co.uk/industry/how-it-works-transition-plan
Shhhhhh (climate change)
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## Premium by council tax band

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<tr>
<th>Cover Type</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
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<tr>
<td><strong>Wales: A/B/C</strong></td>
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<td>£330</td>
<td>£408</td>
<td>£540</td>
<td>£1,200</td>
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</table>
How to flood protect a home

- Flood-proof doors £750 – 2,500+ (or demountable door guards £2,380)
- Airbrick covers £180 – 1,680
- Resilient plaster £6,300 – 8,200
- Concrete/sealed floors £7,600 – 12,500
- Raise appliances £700 – 1,100
- Periphery wall/free standing barriers £5,000 - 12,000
- Additional external layer (render, bricks etc) £2,500 – 4,000 per property
- Automatic door guards £8,000
- Sump and pump £50 – 2,500
- Raise floor levels £28,200 – 44,700
## How to flood protect a home

<table>
<thead>
<tr>
<th>Property type</th>
<th>Option</th>
<th>Description</th>
<th>Low cost</th>
<th>Medium cost</th>
<th>High cost</th>
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<tbody>
<tr>
<td>Residential</td>
<td>Standard resilience</td>
<td>Resilient plaster, removable doors, internal wall rendering, resilient kitchen, raised electrics and appliances</td>
<td>£6,210</td>
<td>£7,830</td>
<td>£9,450</td>
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<tr>
<td></td>
<td>Premium resilience</td>
<td>Concrete/sealed floors, resilient plaster, removable doors, internal wall rendering, resilient kitchen, raised electrics and appliances</td>
<td>£9,620</td>
<td>£11,870</td>
<td>£14,130</td>
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