



# FIMFRAME Stakeholder Workshop

Andy Moores

Evidence Programme Manager

16 Sept 2011

# Context

- ⇒ Background to Project
- ⇒ Current Status
- ⇒ Aims of the day
- ⇒ Introductions

# Background

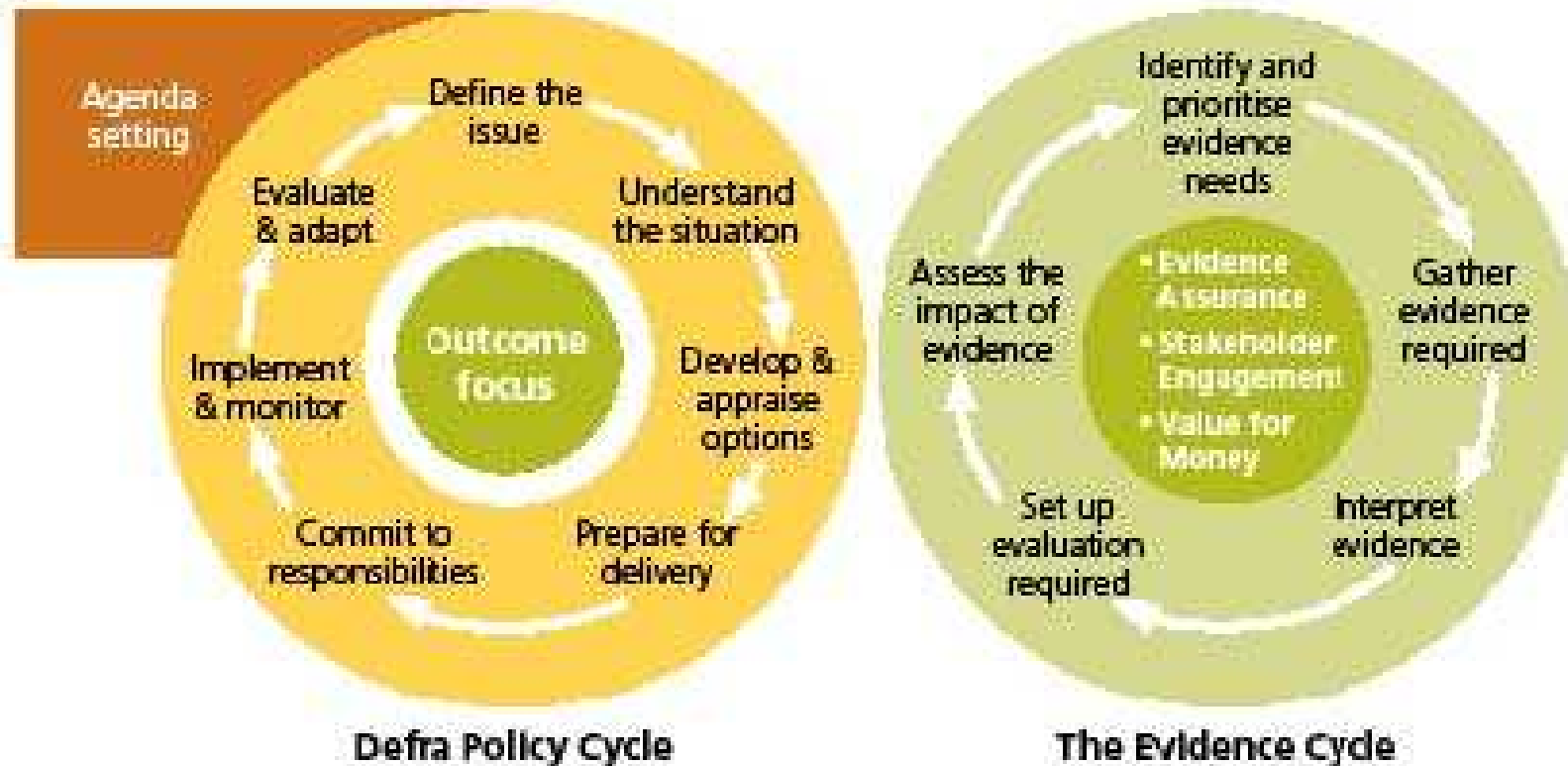
- ➔ What is CRUE
- ➔ FIM FRAME project (GB, NL, FR)
- ➔ OM7
- ➔ The proportion of emergency flood response plans which are considered by the Local Resilience Forums (LRFs) to satisfactorily address flood risk.....No target set

# Current Status

- ⇒ R&D Project closing
- ⇒ Hear today about why, how, what....
- ⇒ Commitment to involve users

## Annex 1: Good practice in using evidence

Figure A1. The Polky and Evidence Cycles



# Aims of the day

- ⇒ Disseminate
- ⇒ Sense check approach
- ⇒ Discuss uptake and next steps

⇒ Introductions.....



HR Wallingford  
*Working with water*



## ERA NET CRUE

# Flood Incident Management – A FRAMEwork for improvement (FIM FRAME)



1. Improving risk awareness and increasing public participation
  2. Flood event management
- 2<sup>nd</sup> ERA NET CRUE issued May 2008
  - Response to 2<sup>nd</sup> ERA NET CRUE call 15 October 2008
  - Selection of projects January 2009
  - Commencement of work 1 September 2009



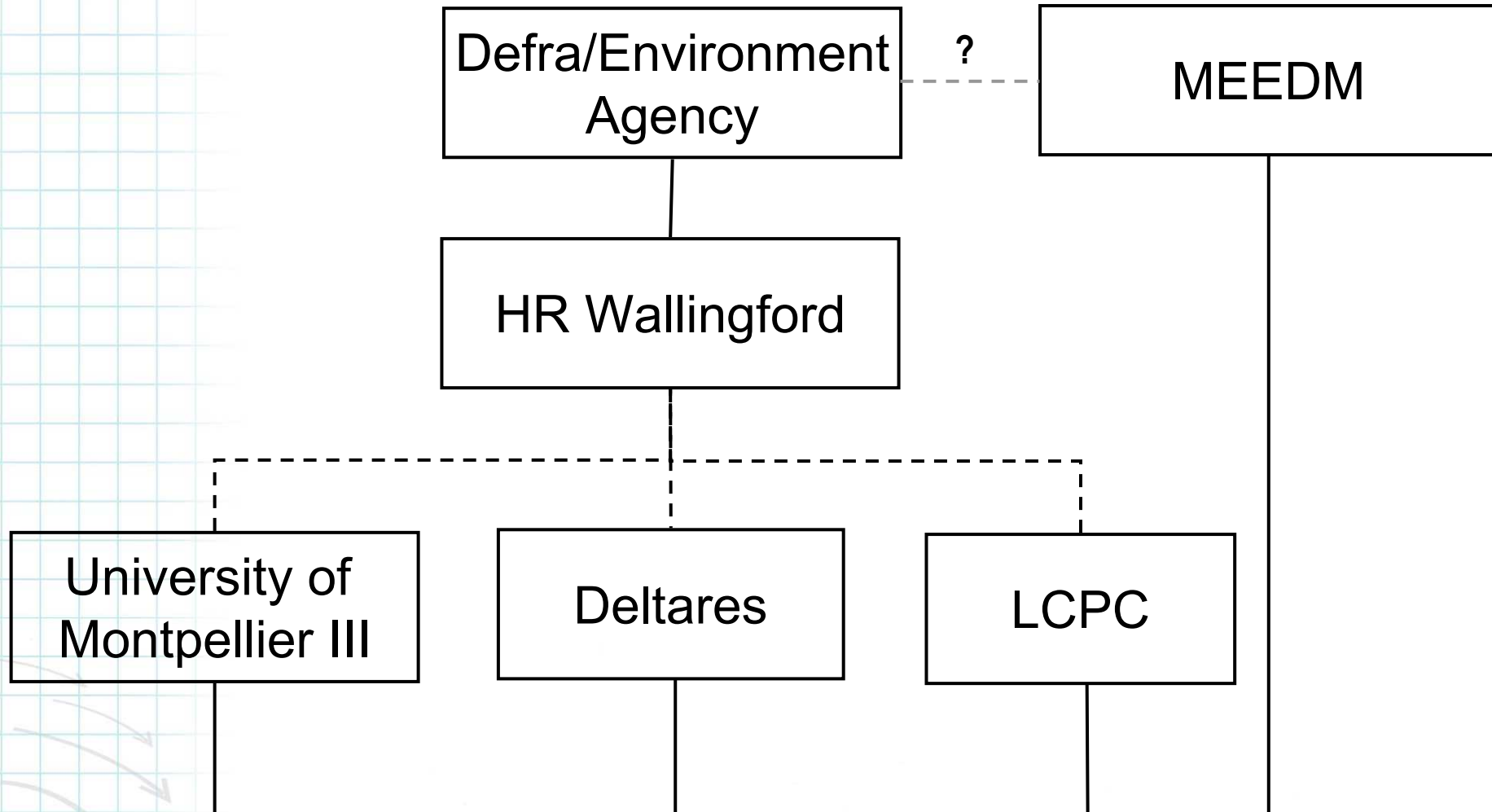
- To assess the effectiveness and robustness of current flood event management plans in the UK, The Netherlands and France and to assess methods by which the plans can be improved
- Evaluate the current tools that are used for flood event management planning and the ability of these tools to support the management of future flood emergencies
- To establish how currently available tools can be used to improve emergency management plans for floods and whether there are any gaps in the available tools
- To provide a framework by which flood incident management can be improved that will be tested in a case studies in France, The Netherlands and the UK

- **HR Wallingford - Coordinators**
- **Deltares (Formerly Delft Hydraulics) – The Netherlands**
- **Gestion des Sociétés, des Territoires et des Risques (GESTER), University of Montpellier III, France**
- **Laboratoire des Ponts et Chaussées (LCPC), Nantes, France now Institut Français des Sciences et Technologies des Transports, de l'Aménagement et des Réseaux (IFSTTAR)**

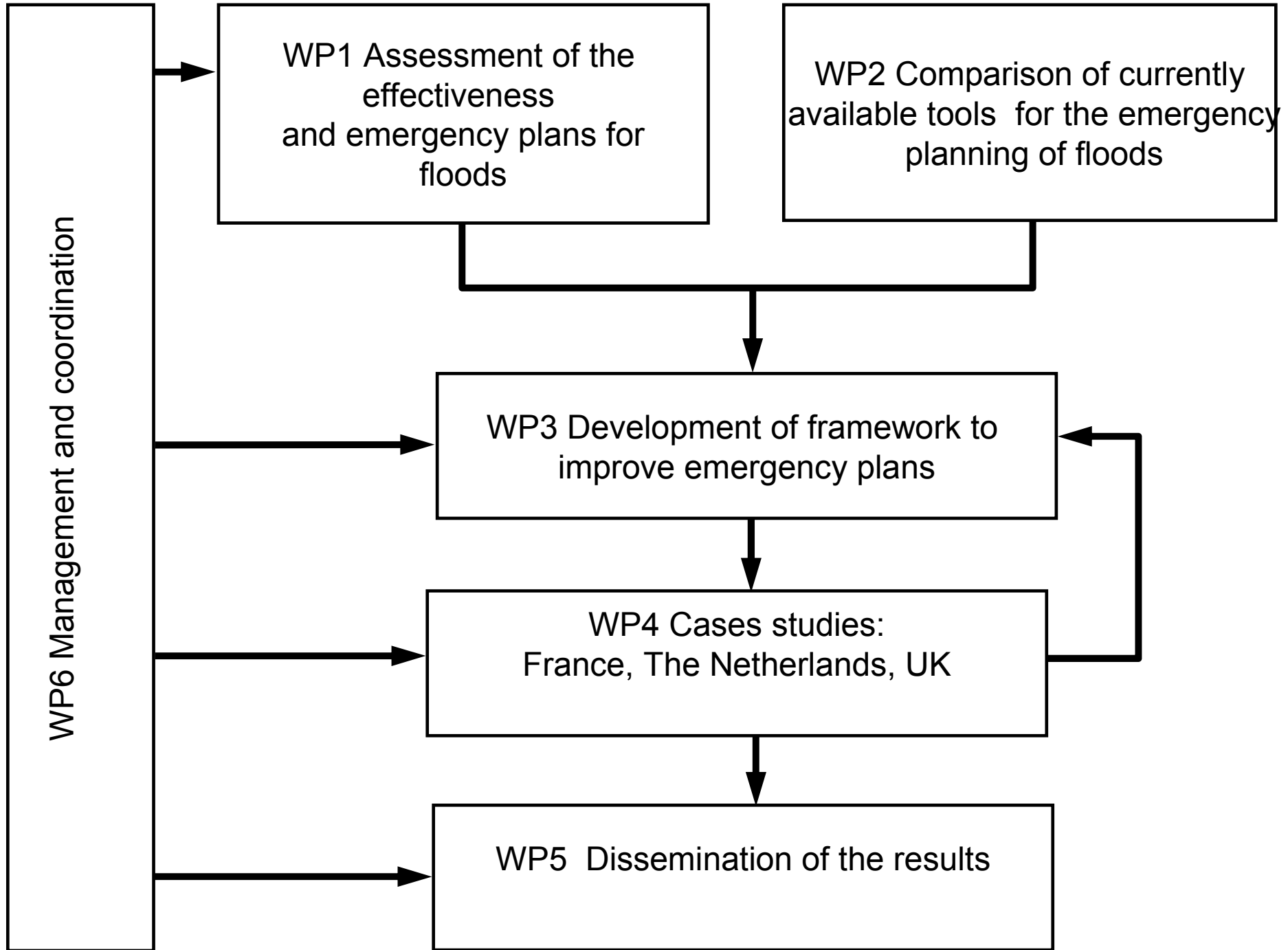
- **Total funding approximately €300,000**

- **Funders**

- Ministère de l'Ecologie, de l'Energie, du Développement durable et de la Mer, en charge des Technologies vertes et des Négociations sur le climat (MEEDDM), France - €120,000
- Defra/Environment Agency - €112,000
- Partners - €45,000
- Royal Academy of Engineers - €23,000



- **WP1 “Effectiveness and robustness” of emergency plans for floods**
- **WP2 Comparison of currently available tools for the emergency planning of floods**
- **WP3 Development of framework to improve emergency plans for floods**
- **WP4 Case studies utilising the developed framework to improve emergency plans**
- **WP5 Dissemination of the results**
- **WP6 Coordination**



WP6 Management and coordination

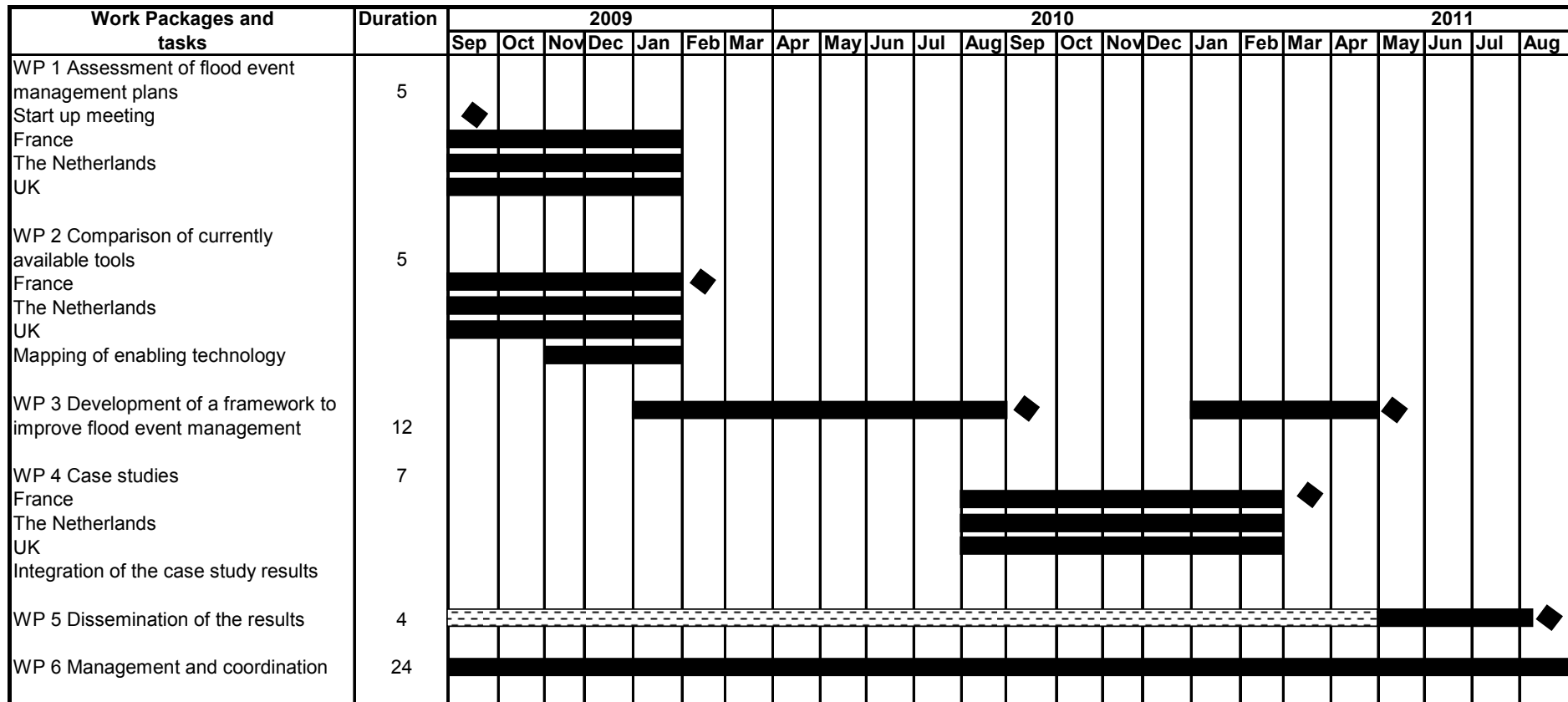
WP1 Assessment of the effectiveness and emergency plans for floods

WP2 Comparison of currently available tools for the emergency planning of floods

WP3 Development of framework to improve emergency plans

WP4 Cases studies: France, The Netherlands, UK

WP5 Dissemination of the results



◆ Key milestone    WP activity     Ongoing activity 





**East coast flood, Essex, UK, 1953**





**The Great Flood of Paris, France, 1910**

Date	Location	Consequences
2009	Severe flooding experienced over north-west England and south-west Scotland during the period 18 to 24 November	500 homes and businesses flooded, eight bridges destroyed, damage estimated at £100 million
2007	Widespread and severe flooding affecting many rivers in June and July 2007 including the lower Severn basin, headwater tributaries of the Thames, as well as Yorkshire and Humberside	14 deaths, 55,000 homes and 6,000 businesses inundated. Over £3 billion of damage
2005	The town of Carlisle, in the north-west of England, suffered severe flooding	The consequences included: three deaths; 1,925 homes and business flooded; 3,000 people being made homeless for up to 12 months, 40,000 properties without power
2004	Flash flooding in Boscastle in Cornwall	58 properties flooded and four destroyed. Damage to buildings and services estimated at £2 million
2000	Widespread flooding in November 2000 throughout England and Wales	8,000 properties were flooded with the total damage estimated to be approximately £500 million
1998	Extensive areas of the Midlands flooded	Flood damage estimated at £1.5 billion



Date	Location	Consequences
15 June 2010	Var Département in southern France	28 people killed as the result of flash floods
28 February 2010	West Atlantic Coast, Vendée and Charente regions of western France	47 people killed as the result of coastal flooding owing to dike failures
15 November 2005	Southern France, Perpignan area	Two people killed as the result of flash floods
6 to 9 September 2005	Gard and Herault areas and Nimes. Lunel and Montpellier	Two people killed as the result of flooding
1 to 3 December 2003	Southern France - Rhone valley - Marseilles and Lyon areas. Bouches-du-Rhone region. Vaucluse, Ardeche, Charlieu, Avignon, Orange. Herault, Gard, Arles, Ardeche.	Nine people killed as the result of fluvial floods, flash floods and dike failure. Damage estimated at €1.5 billion
8 September 2002	Gard, Herault and Vaucluse departments. Nimes and Avignon areas. Aramon, Sommieres, Russon.	23 deaths as the result of flash floods. Damage estimated at €1.19 billion



- **Emergency planning governed by the Civil Contingencies Act 2004**
- **Multi-Agency Flood Plans (MAFPs) produced by Local Resilience Forums**
- **47 Resilience Forums in England and Wales**
- **Higher the risk the more detail is required in the MAFPs**
- **March 2010 – 323 MAFPs had been produced**

- **Emergency planning organised at a Commune level in France**
- **36,500 Communes each with their own mayor**
- **Plan Communal Sauvegarde (PCS) – Act passed in 2005**
- **10,000 Communes required to produce PCSs**
- **To date 5,000 have been produced**

Aspect of flood risk management	France	England and Wales
Fluvial flood forecasting	Service Central d'Hydrométéorologie et d'Appui à la Prévision des Inondations	Environment Agency
Coastal flood forecasting	Service Hydrographique et Océanographique de la Marine (SHOM)	Environment Agency
Assessment of flood hazard and risk	Direction Régionale de l'Environnement, de l'Aménagement et du Logement (DREAL)	Environment Agency
Maintenance of fluvial and coastal flood defences and structures	A wide range of organisations	Environment Agency and in some cases local authorities and ports

Aspect of flood risk management	France	England and Wales
Emergency planning for floods	Mayors of the estimated 10,000 communes affected by floods	Environment Agency in conjunction with emergency responders and other key stakeholders
Guidance on the construction of new developments in areas at risk of flooding	Mayors of the estimated 10,000 communes affected by floods	Environment Agency

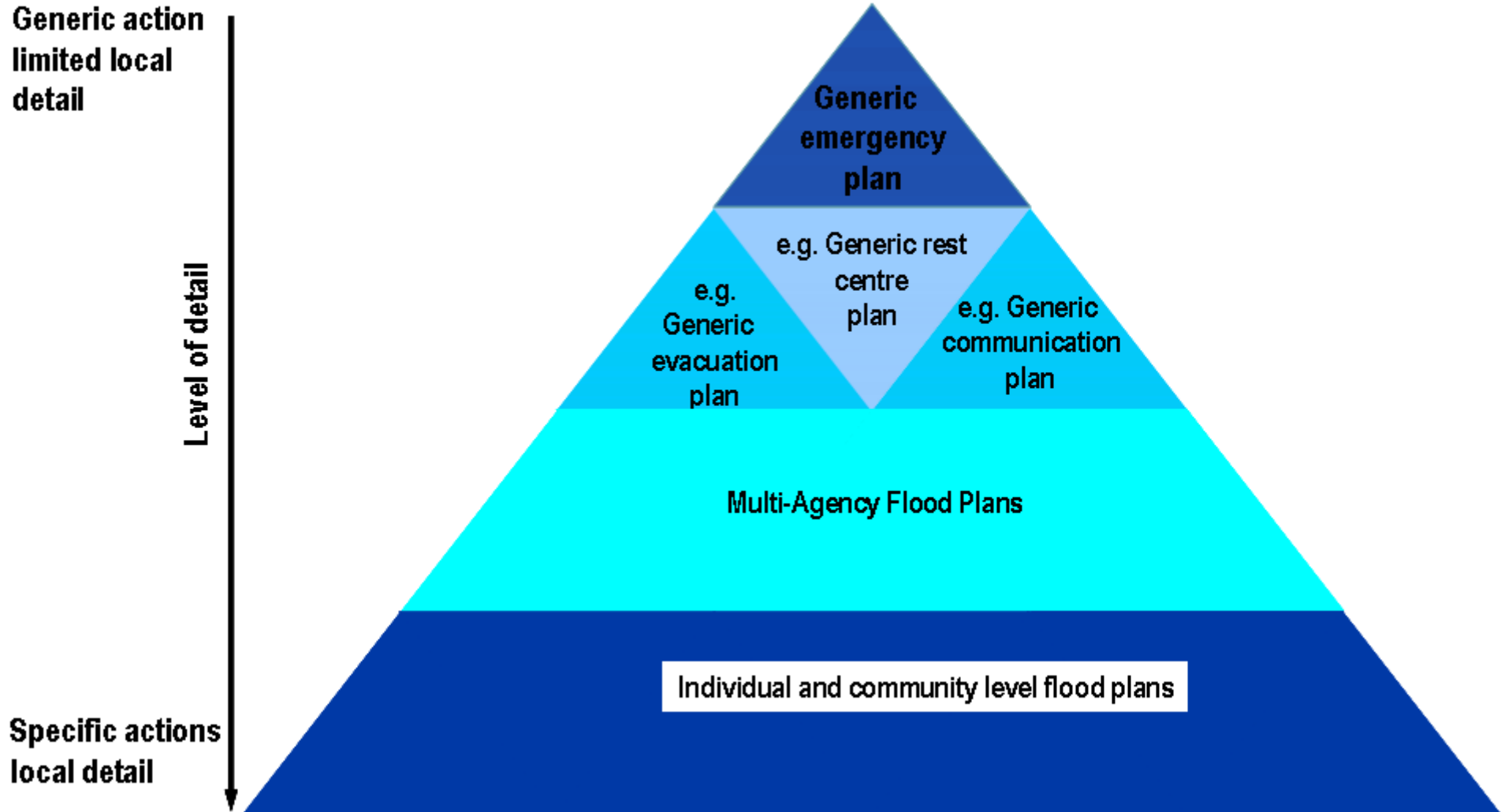


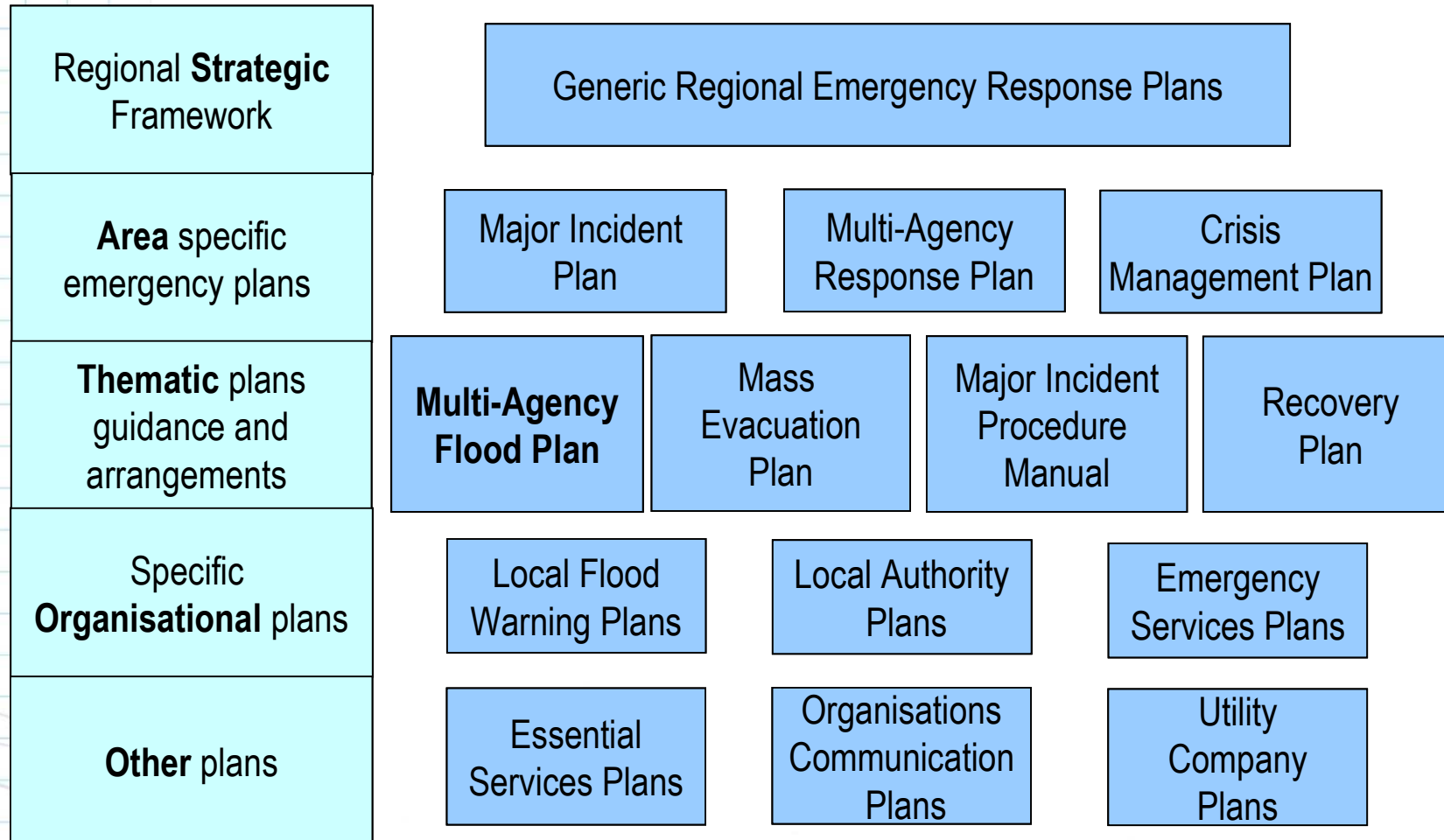
**St Elisabeth's flood, The Netherlands, 1421**








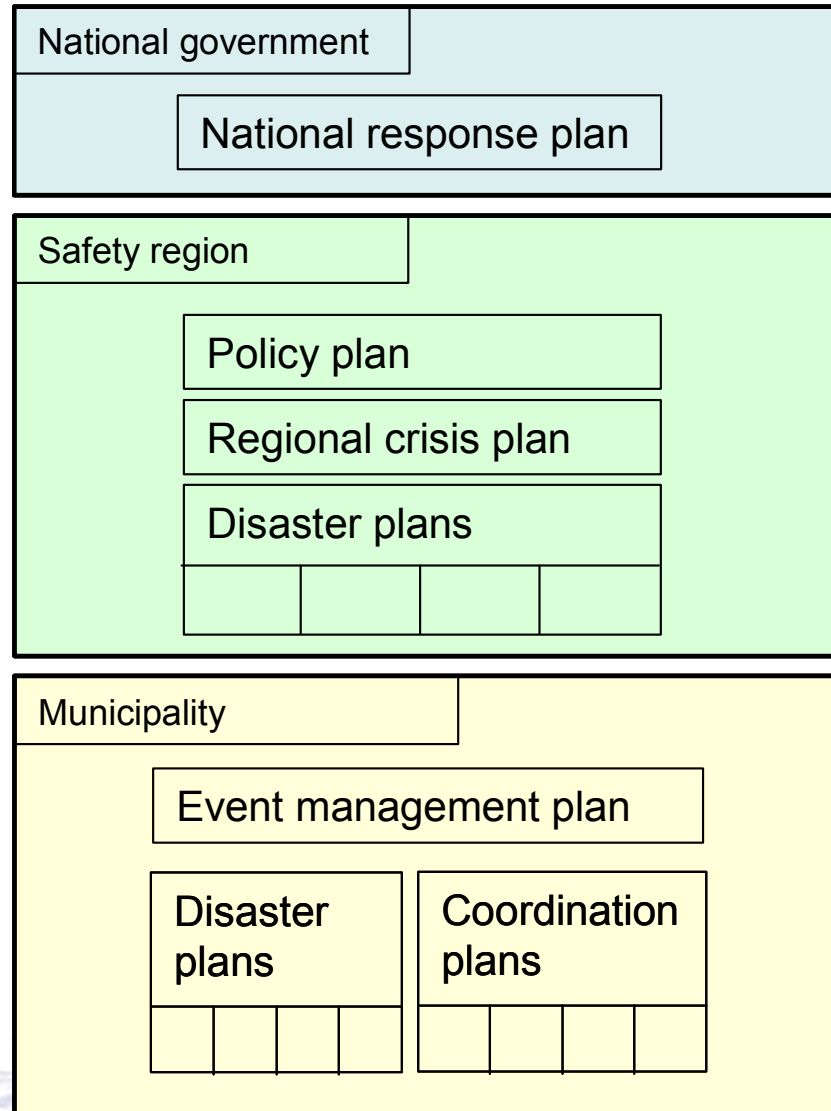
- 3% of the population had made some preparation for flooding; 60% not aware of the risks that they faced; 80% felt safe in their environment
- 25 Safety Regions recently constituted in the Netherlands
- Each Safety Region produces an emergency plan - Draft plans only developed in 2010

- All three countries have passed legislation in the past seven years in some cases has acted as a catalyst for the production of plans
- Hierarchy of emergency plans exists in all three countries (local, regional, national)

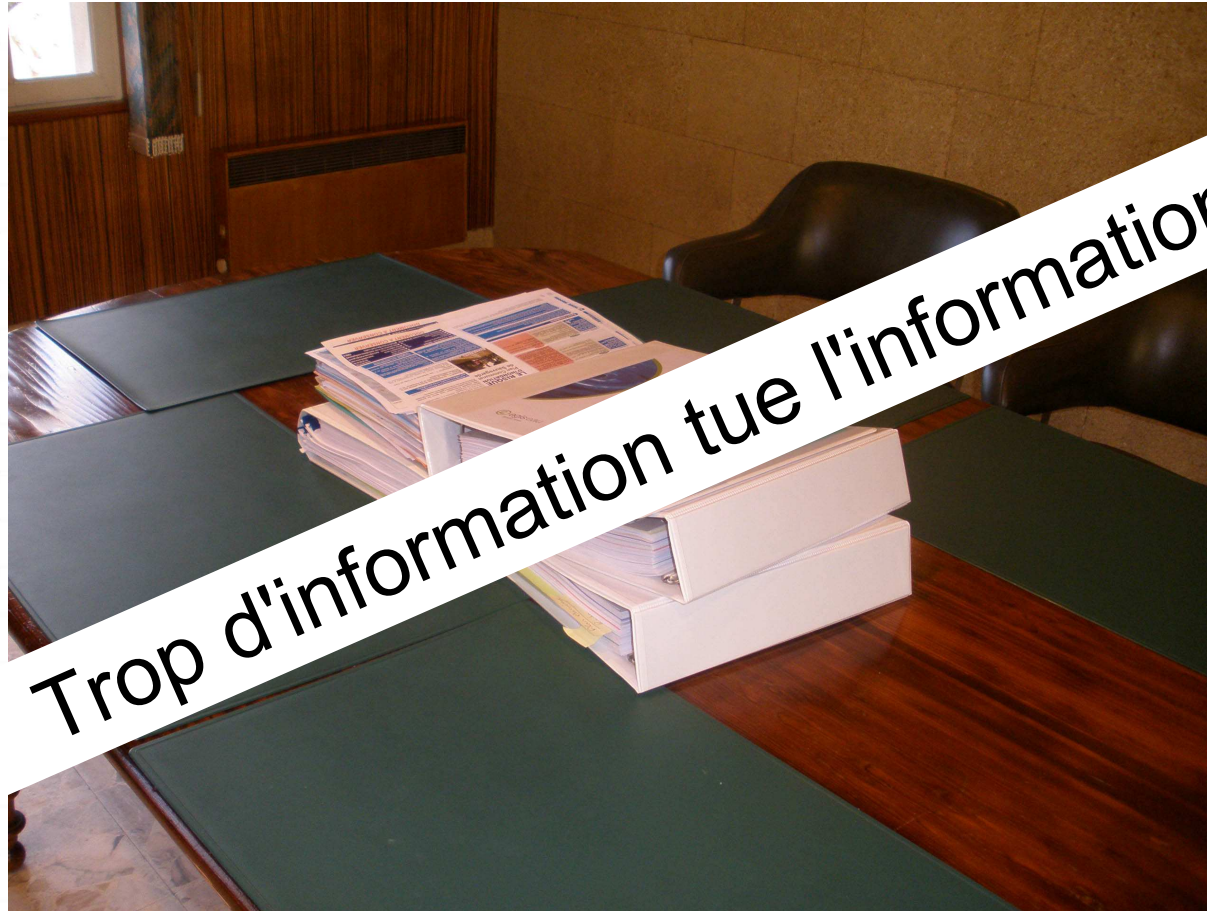




Type of event			Command structure	
Example	Characteristics	Actors	Direction of operations	Role of the COD*
<ul style="list-style-type: none"> <li>• Car accident</li> <li>• Small fire</li> </ul>	<ul style="list-style-type: none"> <li>• Local and immediate consequences</li> <li>• Short duration</li> </ul>	Rescue services (standard action)	 Mayor	Watch
<ul style="list-style-type: none"> <li>• Large car accident</li> <li>• Extended fire</li> </ul>	<ul style="list-style-type: none"> <li>• Local and immediate consequences</li> <li>• Duration of a few hours</li> </ul>	Emergency services (rescue with consolidated means)	 Mayor	Follow-up
<ul style="list-style-type: none"> <li>• Car accident with numerous victims</li> <li>• Accident in the transport of dangerous matters</li> <li>• Problematic fires (industrial sites with a PPI**, tunnels...)</li> </ul>	<ul style="list-style-type: none"> <li>• Local and immediate consequences</li> <li>• Duration of a few hours</li> </ul>	Emergency services + Other actors	 Prefet	Support
<ul style="list-style-type: none"> <li>• Industrial accident</li> <li>• Pollution</li> <li>• Large inundation</li> <li>• Storm</li> </ul>	<ul style="list-style-type: none"> <li>• Extended to several Communes</li> <li>• Duration of a few days</li> <li>• Post-event consequences</li> </ul>	Emergency services + Other actors	 Prefet	Direction
<ul style="list-style-type: none"> <li>• Extended storm (1999)</li> <li>• Epidemic</li> <li>• Extreme flood</li> <li>• Nuclear accident</li> </ul>	<ul style="list-style-type: none"> <li>• Extended to a large part of a département or to several départements</li> <li>• Duration of a few days to few weeks</li> <li>• Post-event consequences</li> </ul>	General mobilization	 Prefet	Strengthened direction



- All three countries have passed legislation in the past seven years in some cases has acted as a catalyst for the production of plans
- Hierarchy of emergency plans exists in all three countries (local, regional, national)
- Often a “disconnect” and/or “overlap” between the different levels of plans
- Local authorities often have a limited capacity to develop plans
- Plans vary in length and quality!







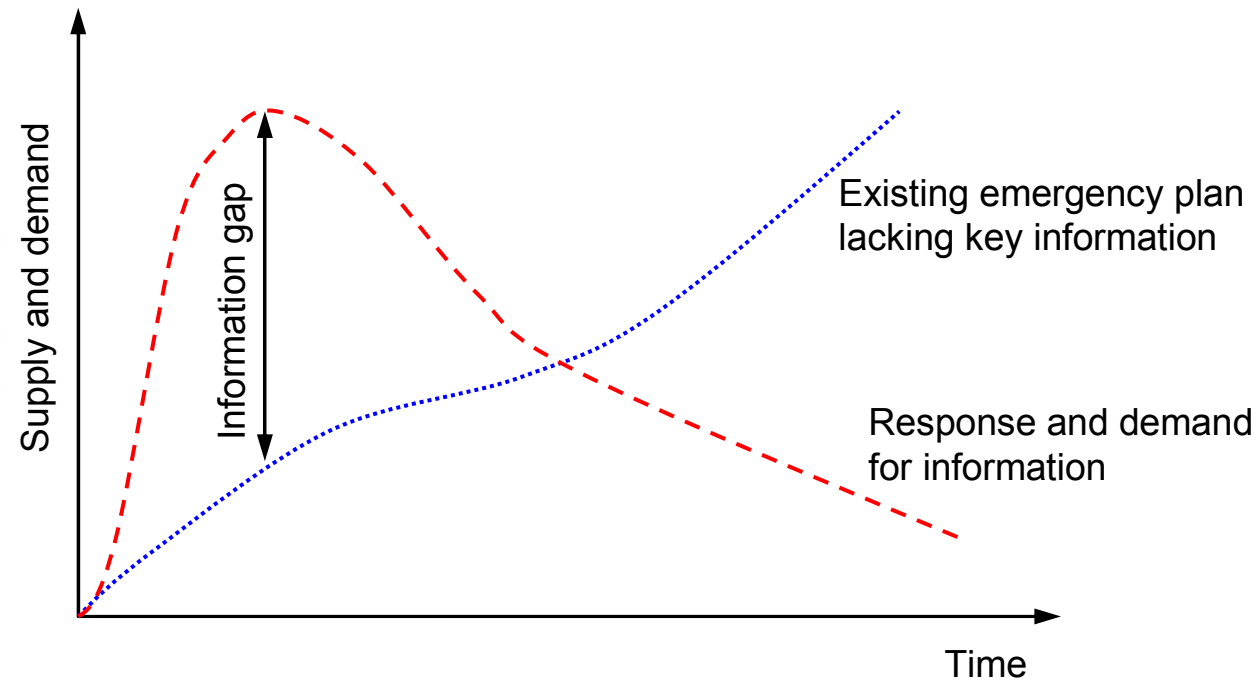
HR Wallingford  
*Working with water*



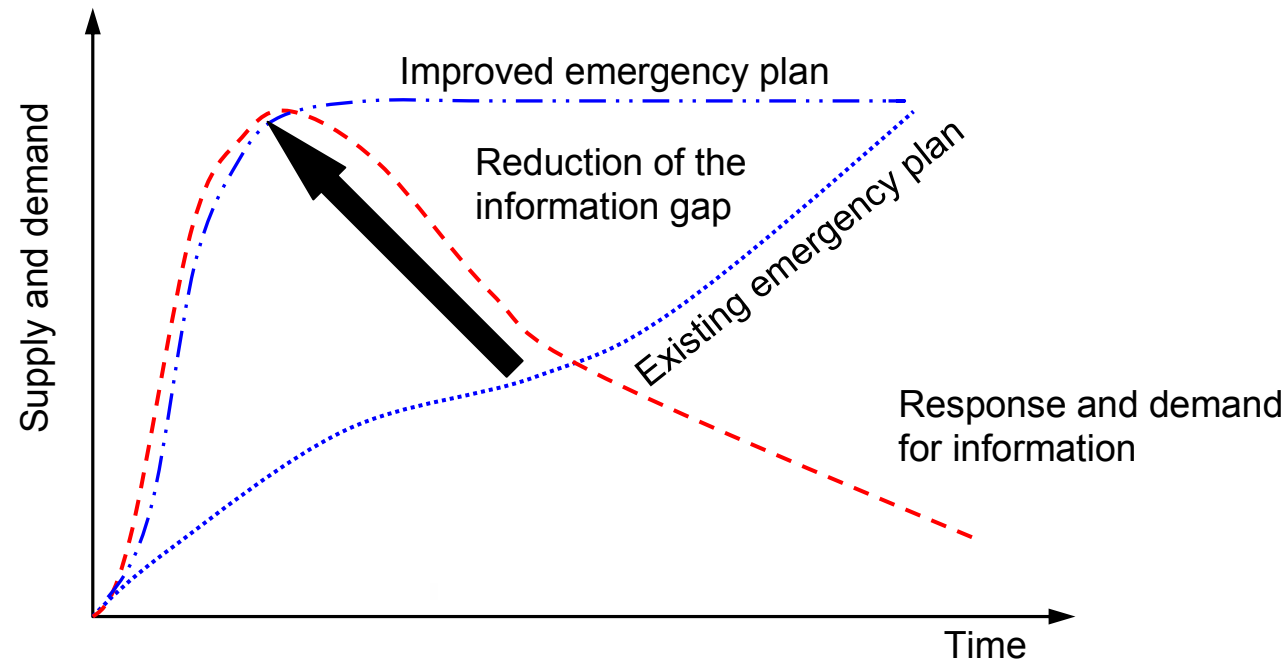
# Development of the metrics and use of tools



## “Information gap”



## Reducing the information gap



- Little in the way of metrics via which the “fitness for purpose” of emergency management plans for floods can be assessed
- Twenty-two metrics were developed to assess flood emergency plans. These fall into six categories as follow:
  1. Objectives, assumptions and target audience
  2. Organization and responsibility
  3. Communication
  4. Flood hazard
  5. Flood risk to receptors (e.g. people, buildings, critical infrastructure)
  6. Evacuation

Metric	Level of detail		
	Low	Medium	High
<b>Objectives, assumptions and target audience</b>			
Aims and objectives of plan	Not detailed	Aims and objectives included but could be clarified further	Clearly stated aims and objectives including the area covered, types and sources of flooding
Target audience and updating of the plan	Not detailed	Audience defined and plan dated	Audience defined and how they will be notified of updates and modifications to the plan included
Assumptions made by the plan	Not detailed	Covers some aspects	Covers all aspects including: flood warning lead time; method by which rescue will be undertaken; implications of the failure of critical infrastructure

<b>Organisation and responsibilities</b>			
Actions, roles and responsibilities	Not detailed	Brief details of the roles and responsibilities related to the activation of the plan provided	Details of the roles and responsibilities related to the activation of the plan provided including health and safety and environmental considerations
Recovery	Not detailed	Brief details of how the recovery is managed	Details of how the recovery is managed including clean up, waste disposal, repairs to public assets, humanitarian assistance
Training and exercises	Not detailed	Brief details of training and exercise requirements	Internal and external (with other organisations) training and exercises outlined
Plan activation	Not detailed	Brief description of the thresholds or levels used to activate plan	Description of the thresholds or levels used to activate plan together with flow chart



<b>Communication</b>			
Communication with other agencies	Not detailed	Outlined in words	Detailed and the links shown diagrammatically
Communication with the public	Not detailed	Outlined in words	Detailed and shown the links shown diagrammatically
Management of the media	Not detailed	Outline media management strategy in place	Well defined media management strategy in place
Flood warning (if available)	Not detailed	Levels of flood warning with details of the areas flooded at each level	Levels of flood warning with details of the areas flooded at each level and shown on a map
Relationship with complementary emergency plans detailed	Not detailed	Outlined in words	Detailed and the links shown diagrammatically

Metric	Level of detail		
	Low	Medium	High
<b>Evacuation</b>			
Evacuation routes	Not detailed	Evacuation routes shown on a map	Evacuation routes detailed together with roads likely to be closed and their accessibility for emergency vehicles and other vehicles
Shelters/Safe havens	Not detailed	Safe havens/shelters shown on a map	Safe havens/shelters shown on a map with their capacity and facilities
<b>Flood hazard</b>			
Flood hazard map	Not detailed	Flood hazard map(s) showing extent	Flood hazard map(s) showing water depth and velocity
Details of previous floods (if available)	Not detailed	Brief description of historical flood	Description of historical floods with the cause and a brief description of the risk in terms of people and properties affected

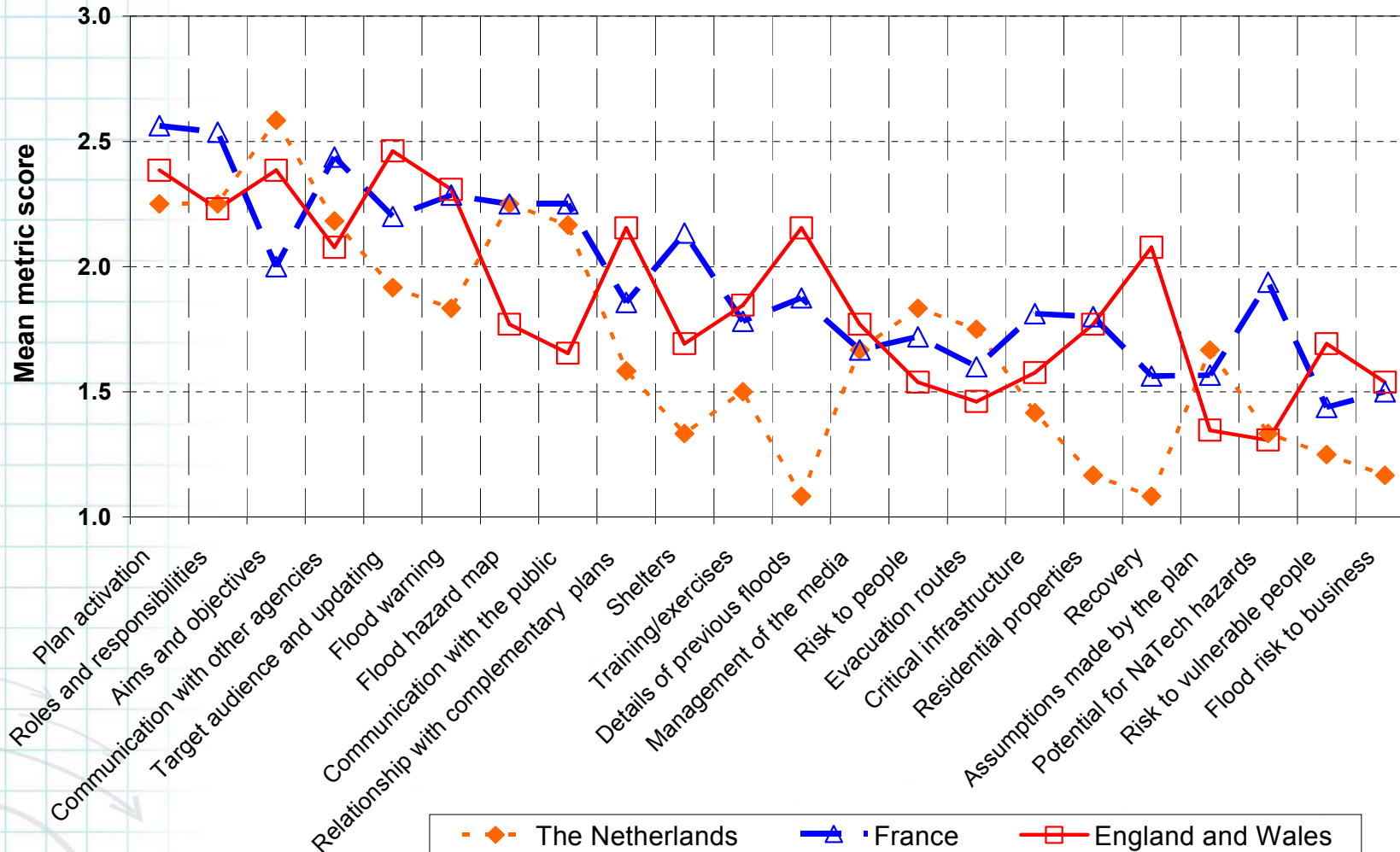


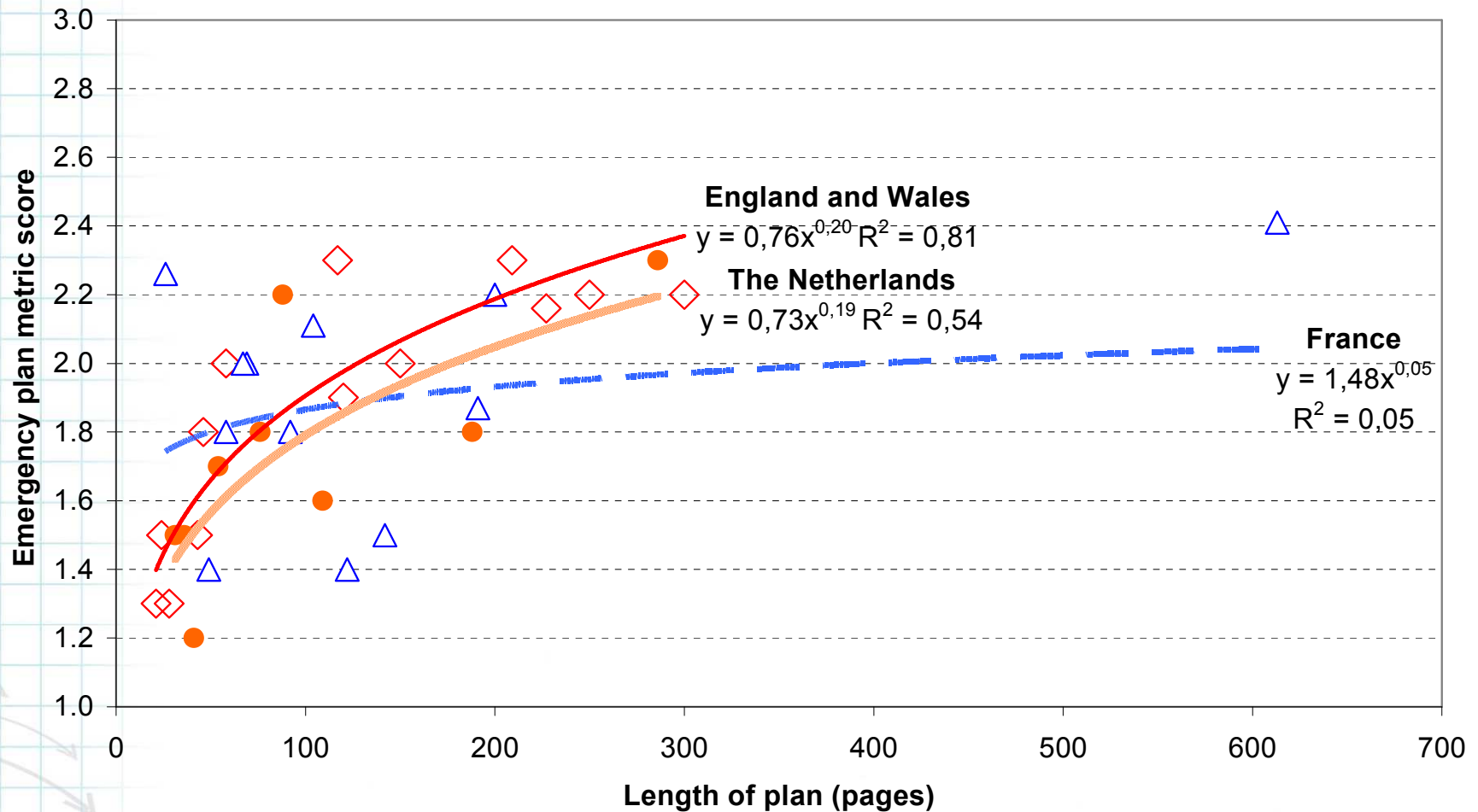
<b>Flood risk to receptors</b>			
Flood risk to people	Not detailed	Number of people potentially affected included	Potential injuries and loss of life included and mapped for a range of scenarios
Flood risk to vulnerable people (e.g. elderly or disabled)	Not detailed	Areas where elderly/sick people live mapped	Numbers of vulnerable people defined with a response strategy
Flood risk to residential property	Not detailed	Number of properties defined	Number of properties defined together with those at risk of collapsing during an extreme flood
Flood risk to businesses	Not detailed	Number of businesses defined	Number and type of businesses defined together with potential losses
Flood risk to critical infrastructure (e.g. water supply, gas, electricity, police, fire brigade)	Not detailed	Number of pieces of critical infrastructure shown on the flood map(s)	Number of pieces critical infrastructure shown on the flood map(s) and an assessment of their likelihood of failure during a flood
Potential for NaTech hazards at industrial facilities (if present)*	Not detailed	Potential NaTech sites shown on map	Potential NaTech sites shown on site and brief details of the response

- Thirty-eight flood emergency plans in England and Wales, France and the Netherlands were assessed using these metrics. The development of the metrics allowed the plans to be “scored” in a quantitative manner
- An online survey was carried out in England and Wales, France and the Netherlands. The questions focused on the requirements for information in the plan development stage, and its usefulness and required level of detail.



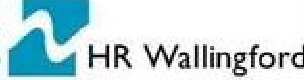
# Example of scoring a plan

Metric	Room for improvement	Acceptable	Good	Score
Aims and objectives of plans			●	3
Target audience and updating			●	3
Details of previous floods		●		2
Flood hazard map		●		2
Flood Warning			●	3
Risk to people		●		2
Risk to vulnerable people			●	3
Flood risk to residential properties		●		2
Flood risk to business		●		2
Flood risk to critical infrastructure		●		2
Potential for NaTech hazards	●			1
Evacuation routes		●		2
Shelters/Safe havens		●		2
Relationship with complementary emergency plans			●	3
Communication with other agencies			●	3
Communication with the public		●		2
Management of the media		●		2
Assumptions made by the plan	●			1
Plan activation			●	3
Actions, roles and responsibilities			●	3
Recovery			●	3
Training and exercises		●		2
Average score				2.3
Rating				"Above average"

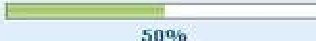




◇ England and Wales △ France ● The Netherlands

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[Exit Survey »](#)



50%

**Q5 Please indicate the level of "usefulness" of the following information, if it were available, in assisting you with the formulation of Local Resilience Forum Multi Agency Flood Plans?**

	1 = Not very useful	2	3	4	5 = very useful	0 = Don't know
Potential injuries and loss of life for a range of flood scenarios	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The "accessibility" of inundated roads to emergency services and other vehicles for different flood scenarios	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Potential damage to critical infrastructure (e.g. gas, water, electricity supplies, police stations etc) by floodwater	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The inter-dependencies between at risk critical infrastructure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other hazards triggered as the result of flooding (e.g. inundation of a chemical plant leading to an additional hazard)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Probability of buildings collapsing during a flood	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Optimal evacuation routes from the inundated area	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The time to evacuate people from areas at risk of flooding	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How improvements in the dissemination of flood warnings could reduce the risk to people	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Optimum location of shelters and rest areas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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FLOODING ERA-NET

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58%

**Q6** Is any other information related to the impacts of flooding in your area, either not currently available or listed in Question 5 above, that you would like to have available to assist you in formulating Multi Agency Flood Plans

No

Yes - Please provide a brief description in the box below

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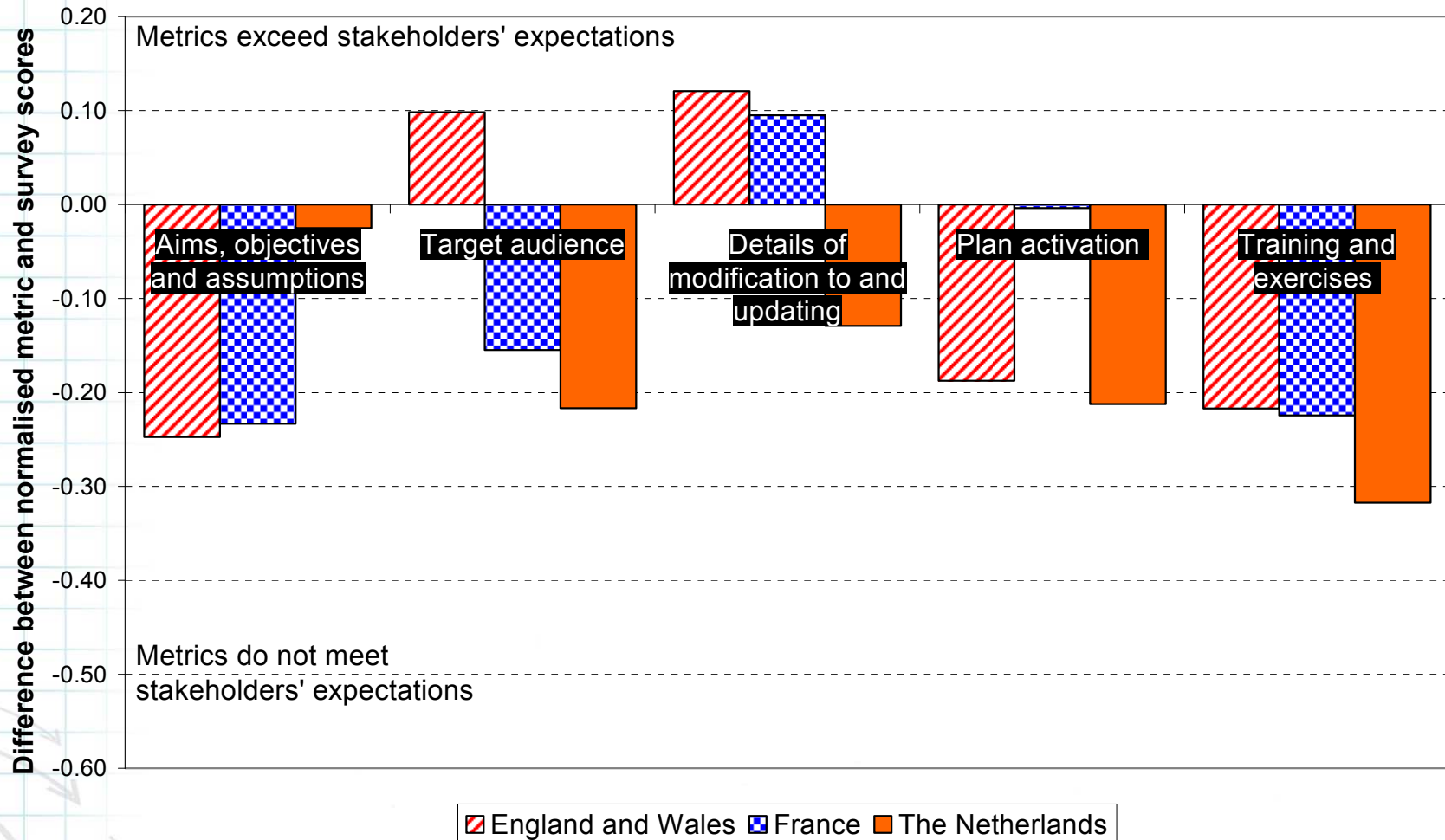
**Q7** Do you think that if you had the information listed in Question 5 available to you this would lead to an improvement in your Multi Agency Flood Plan?

Yes

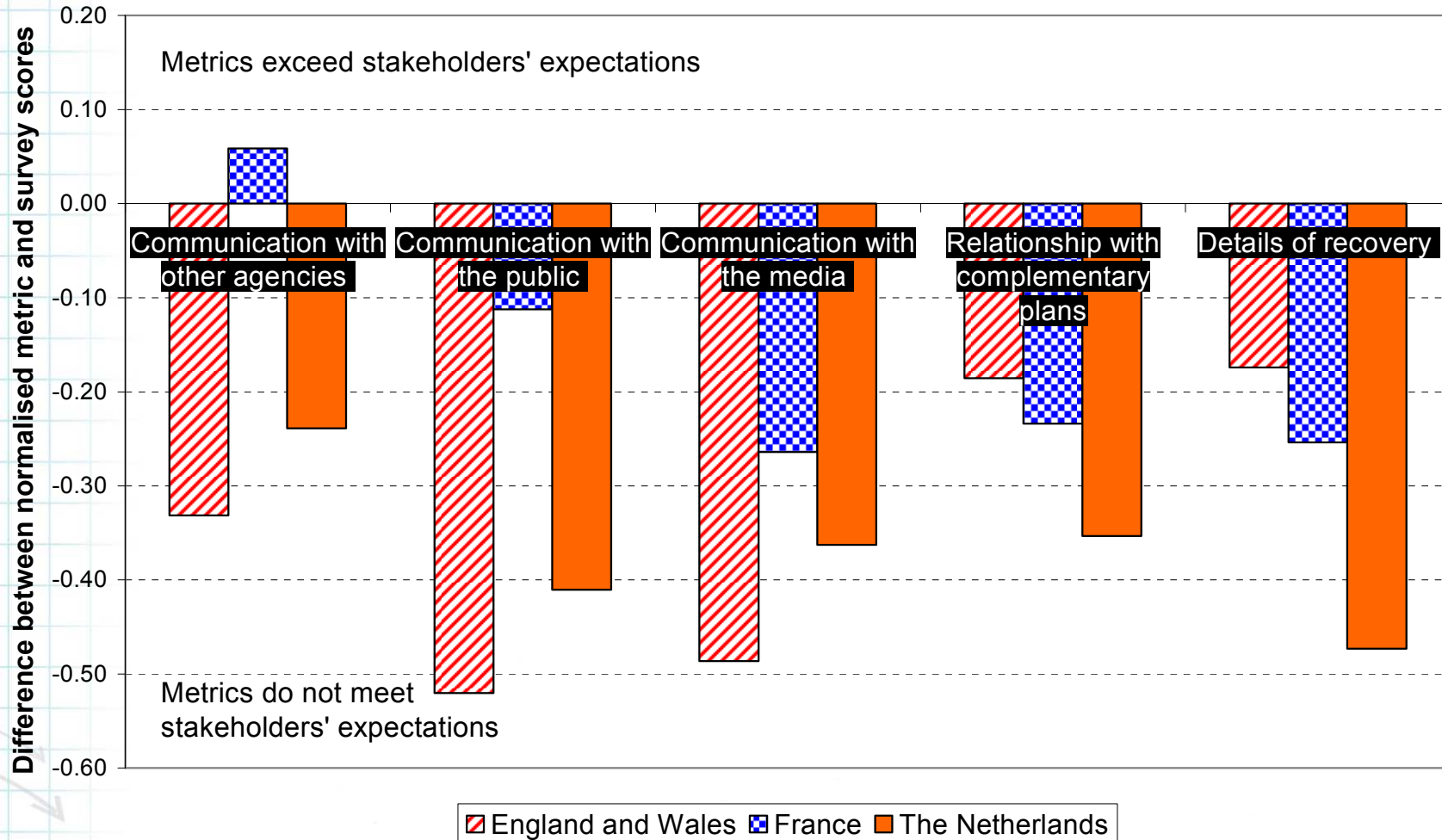
Don't know

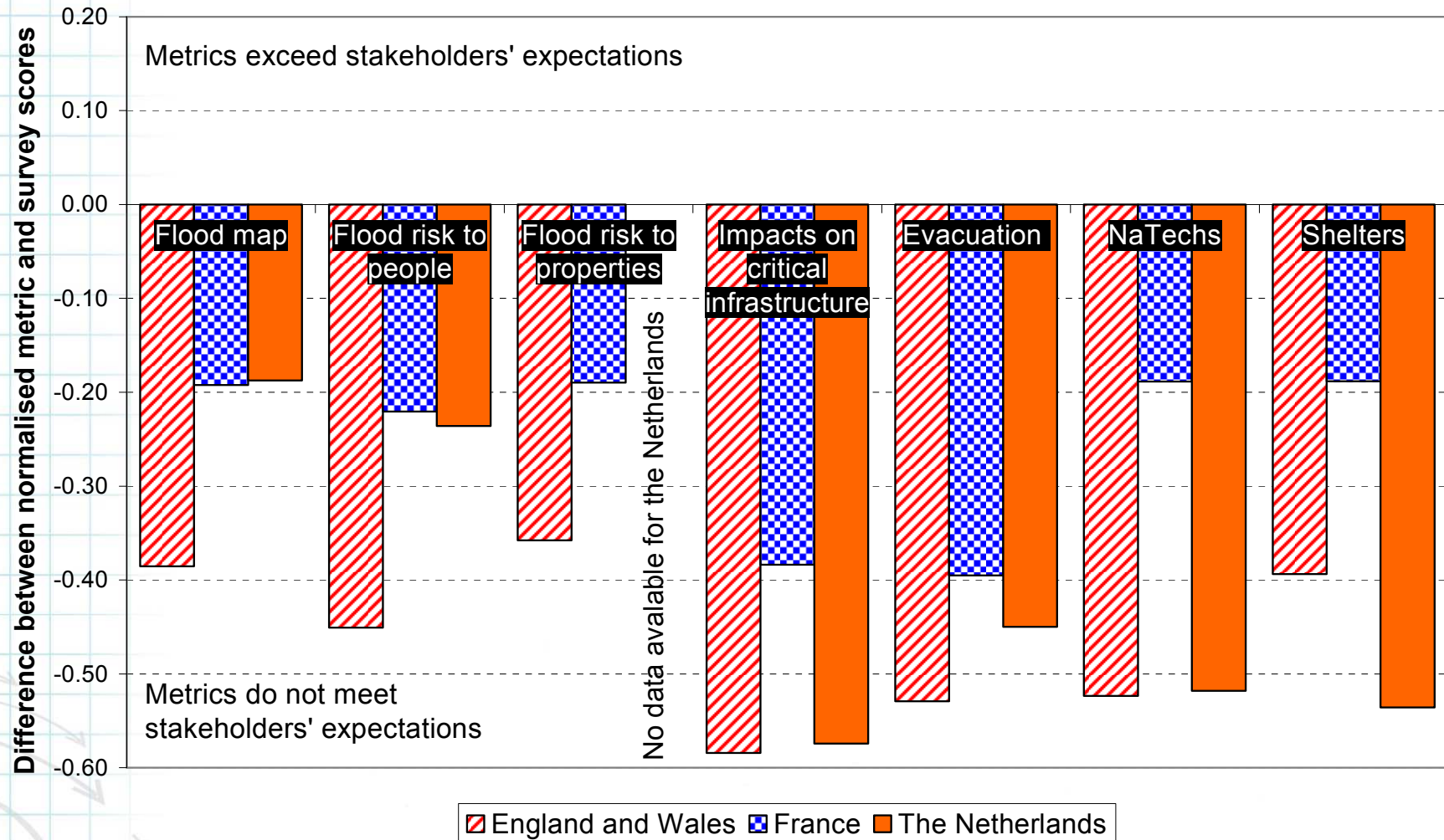
No - Please provide brief reasons why in the box below

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# Factors perceived by stakeholders to be important in making a plan effective

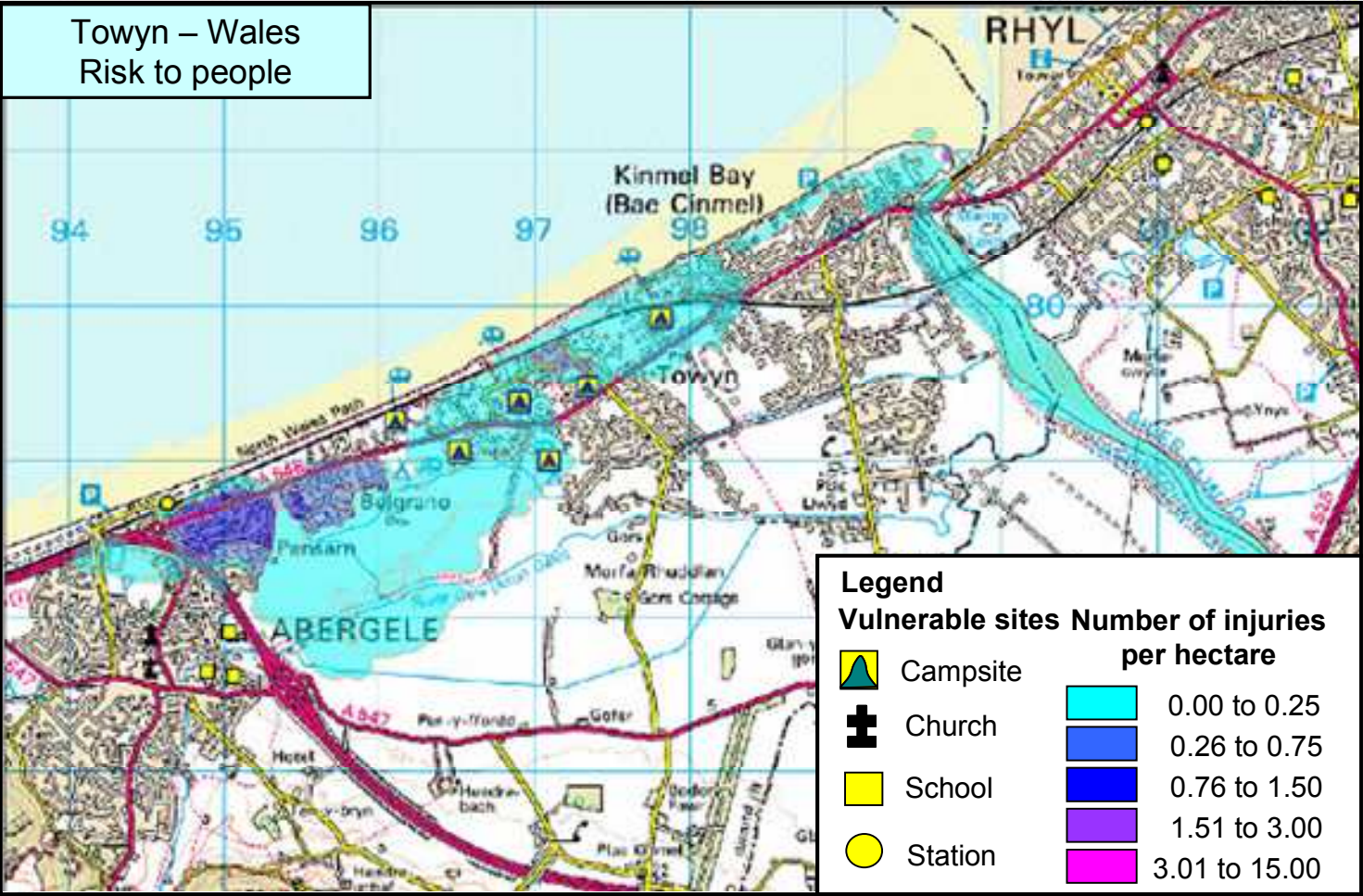
Rank	England and Wales	France	The Netherlands
1	Roles and responsibilities	Roles and responsibilities	Roles and responsibilities
2	Trigger levels	Trigger levels	Information on the flood hazard and related information
3	Information on the flood hazard	Information on the flood hazard	Clarity and accessibility of plans
4	Clarity and brevity of the plan	Adaptability and simplicity	Training in the use of the plan
5	Relationship with other plans	Training in the use of the plan	Trigger levels






- Metrics provide a basis to map the where improvements can be made in the plans and the requirements of the stakeholders
- There was found to be a discrepancy between the level of detail required by emergency planners and the actual level of detail that is available within emergency plans for a number of issues

- A brief review of tools that are available in the three countries was carried out. The tools reviewed fall into the following categories:
  - Guidelines and checklists
  - Flood hazard mapping tools
  - Tools related to assessing the risk to people, vehicles, evacuations times and safe havens
- Online survey regarding use of tools was disseminated to flood managers in the three partner countries

# WP2 – Example of tool to assess injuries




# Survey of flood managers

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FLOODING - ERA-NET

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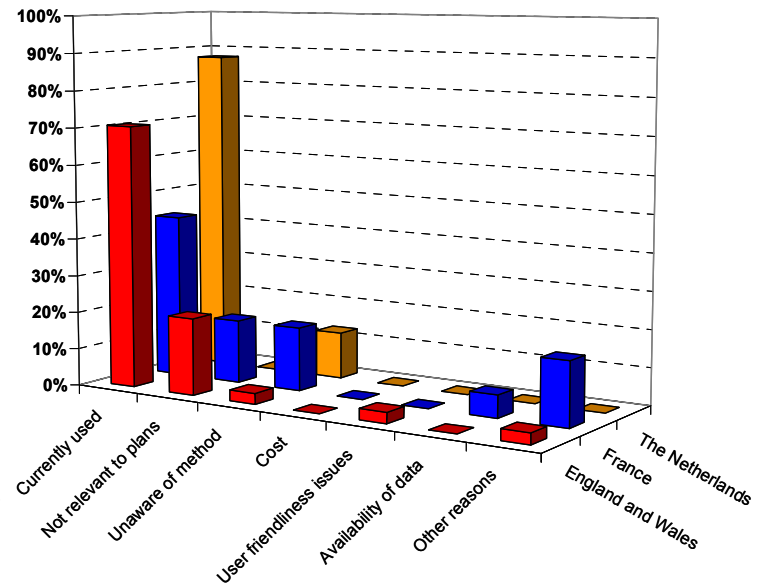
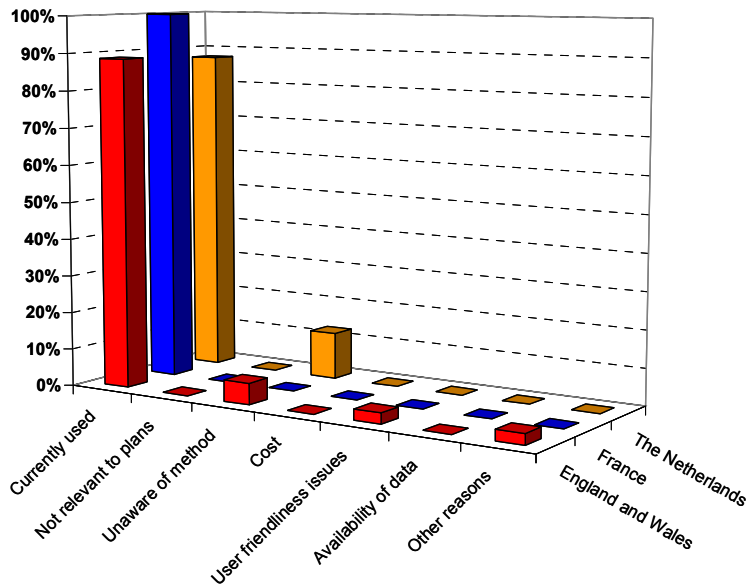


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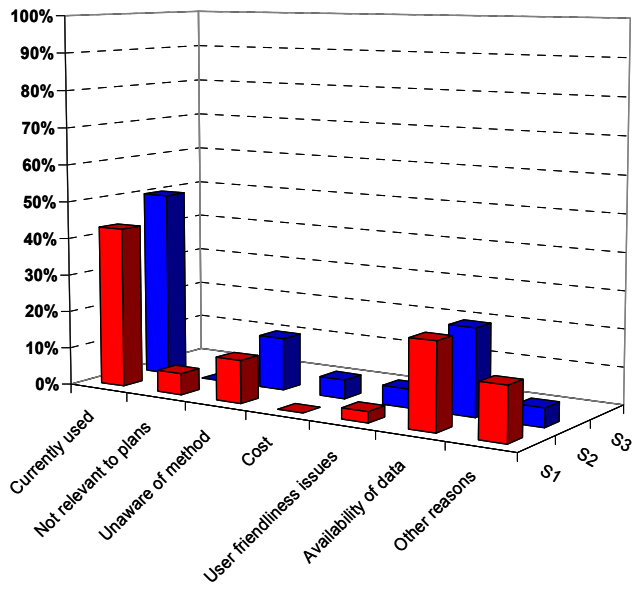
**Q6 For the tools, methods or guidance that are NOT being used to inform Multi Agency Flood Plans by you or other organisations please indicate the main reason why you think they are not used. If you think the tool or method is currently being used please tick the "Currently used" option.**

	Currently used	Not relevant to plans	Unaware of method	Cost	User friendliness issues	Availability of data	Other reasons
Fluvial flood hazard	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Coastal flood hazard	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Flood hazard from dams	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Flood hazard - other sources	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Potential injuries and loss of life	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
"Accessibility" of inundated roads to vehicles	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Optimal evacuation route(s) from inundated areas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Effects of improvements in the dissemination of flood warnings on the risk to people	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Potential damage to critical infrastructure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Methods to assess the inter-dependency between critical infrastructure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Optimising the locations of shelters with respect to floods	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Assessment of other hazards triggered by flooding	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Probability of buildings collapsing during floods	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

# WP2 - Results of flood manager surveys

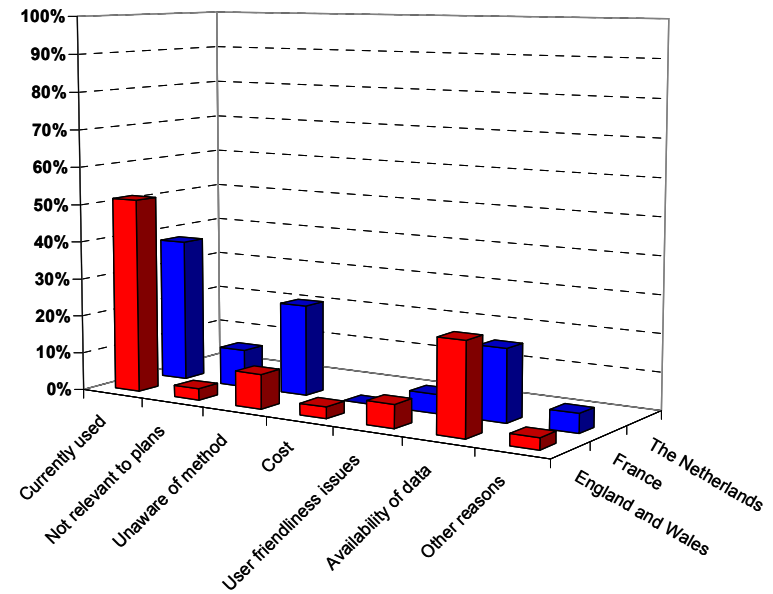


**A Fluvial flood hazard**



Note: This question was not asked in the Netherlands

**B Coastal flood hazard**



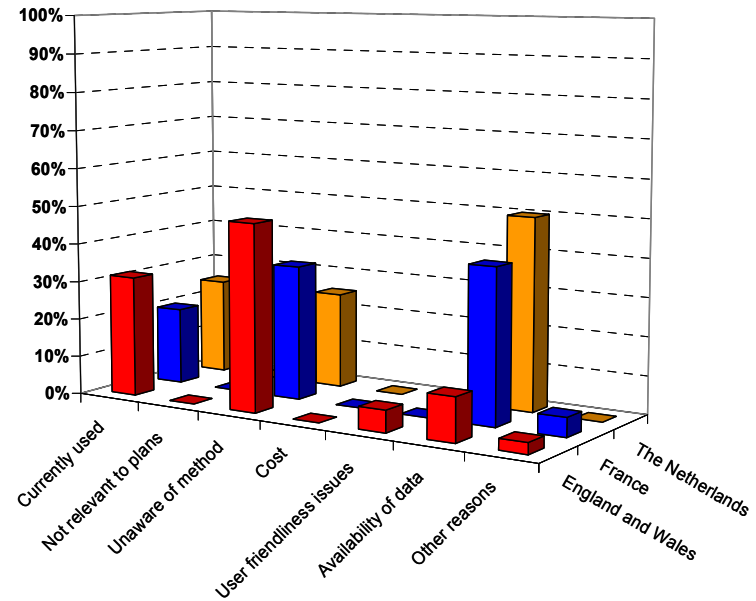
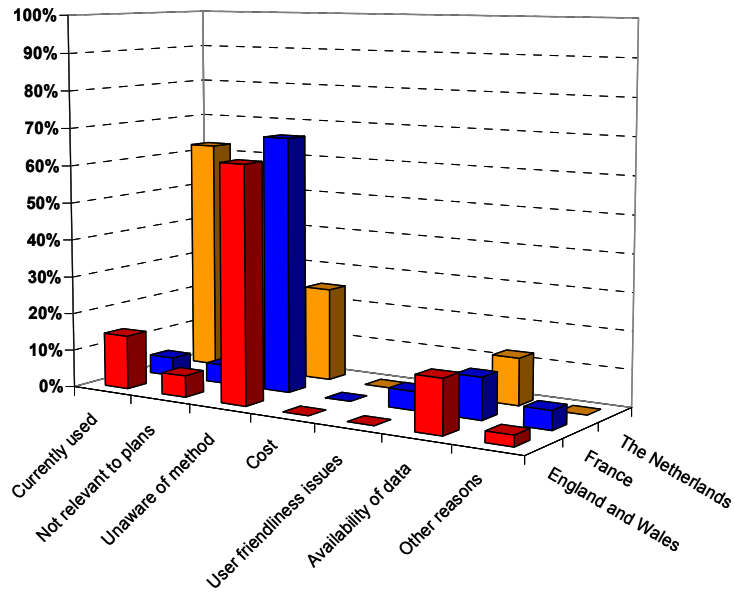
Note: This question was not asked in the Netherlands

**C Flood hazard from dam failure**

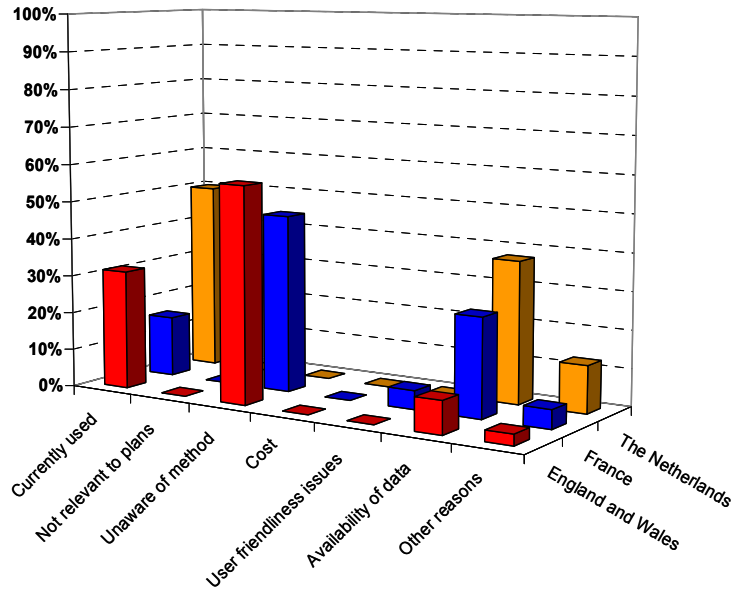
**D Flood hazard from other sources**



# WP2 - Results of flood manager surveys

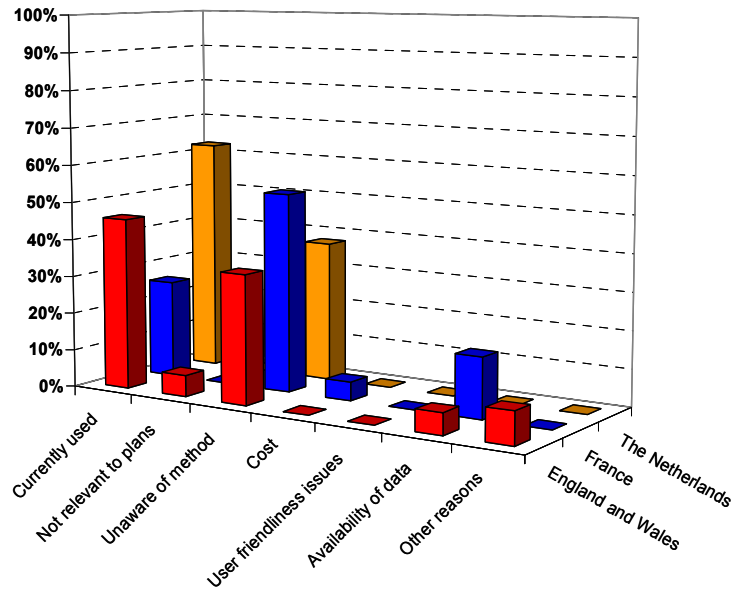


**A Potential injuries and loss of life**



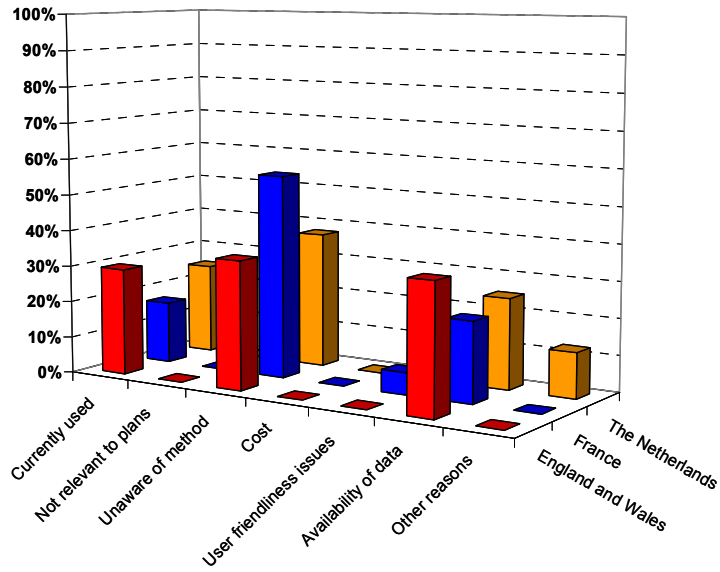
**C Optimal evacuation routes from inundated areas**

**B Accessibility of inundated roads to vehicles**

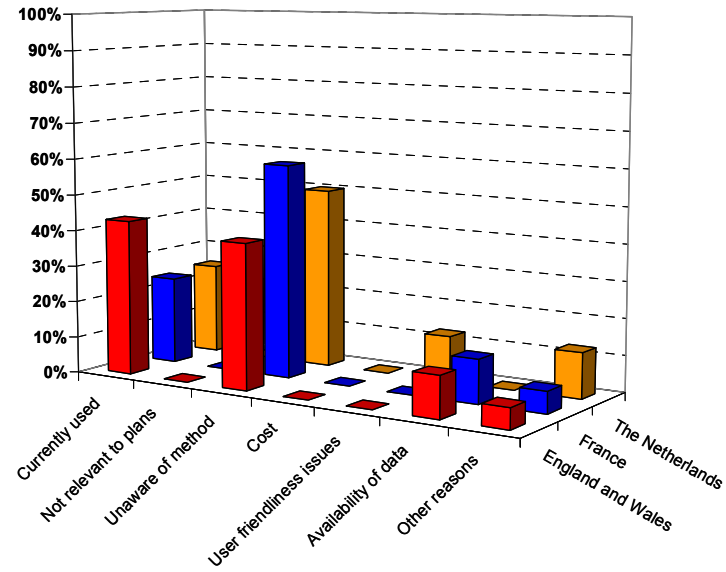


**D Effects of improvements in the dissemination of flood warnings on the risk to people**

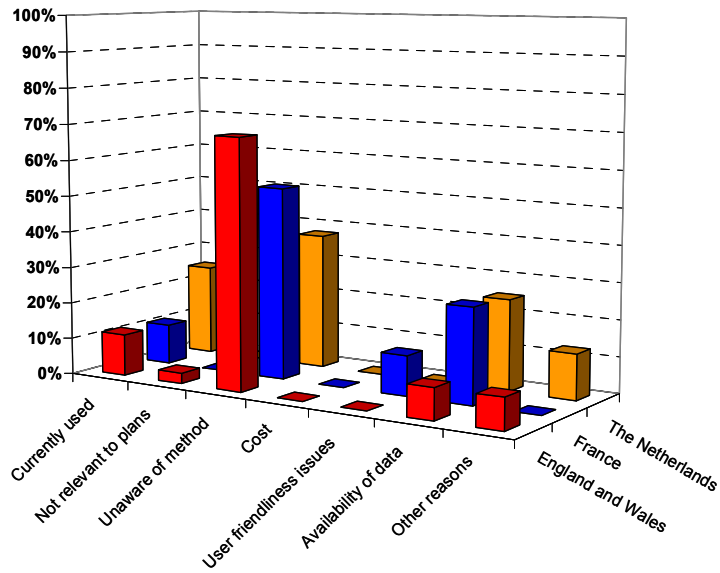
# WP2 - Results of surveys



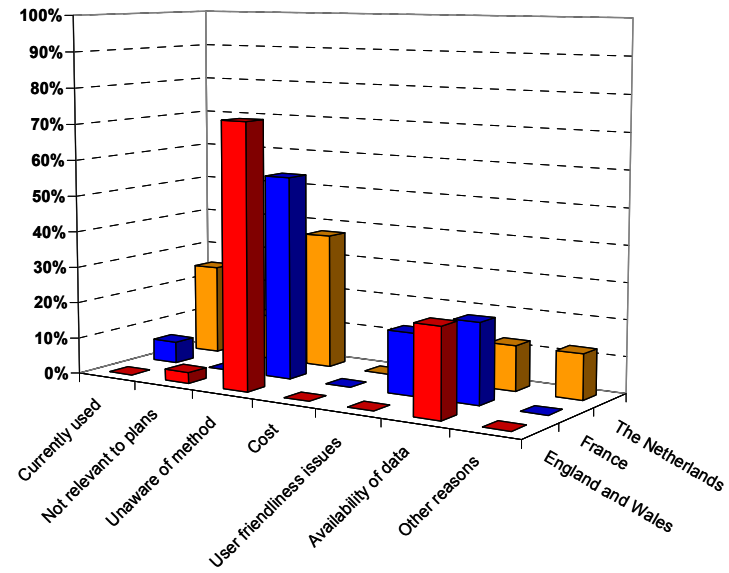
**A Potential damage to critical infrastructure**



**B Optimising the locations of shelters with respect to floods**



**C Assessment of other hazards triggered by flooding**



**D Probability of buildings collapsing during floods**

- The two main obstacles to tools not being used appear to be:
  1. Lack of awareness of the methods that are available
  2. Availability of data
- There is a requirement for some form of guidance on what tools are available, what data they require and how they can be implemented to give information that can be used to improve emergency plans for floods.



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*Working with water*



# Questions?





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*Working with water*



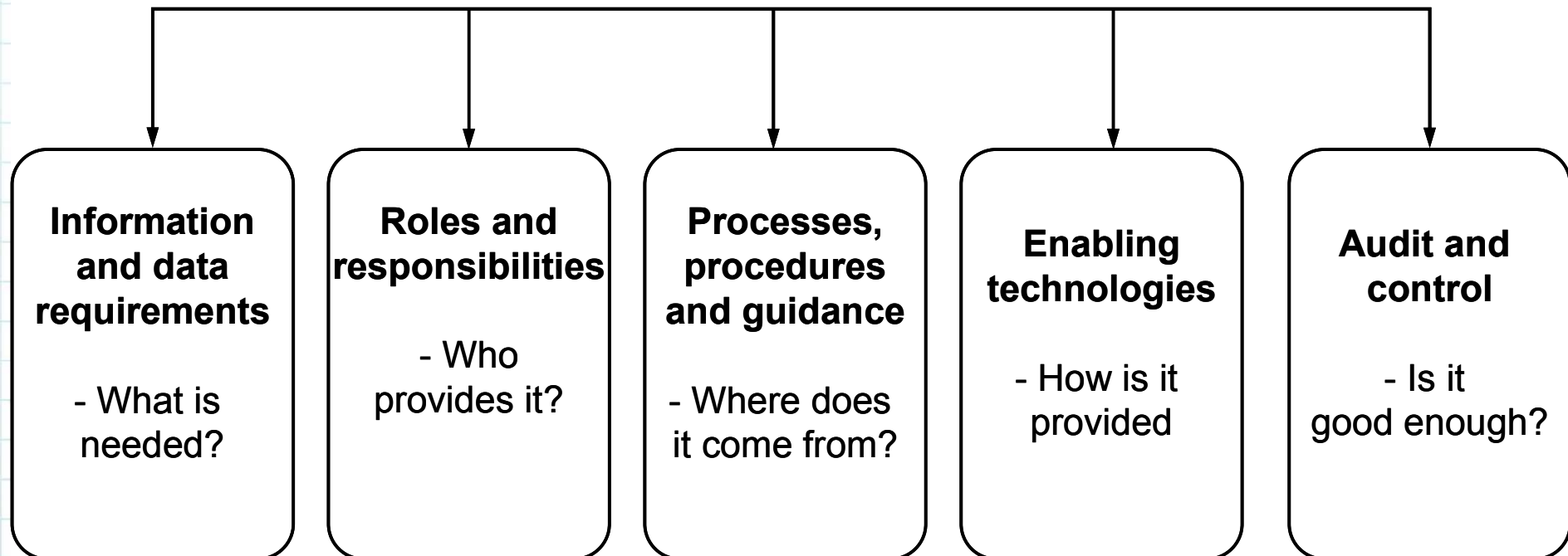
# ERA NET CRUE

# FIM FRAME

## Development and application of the framework



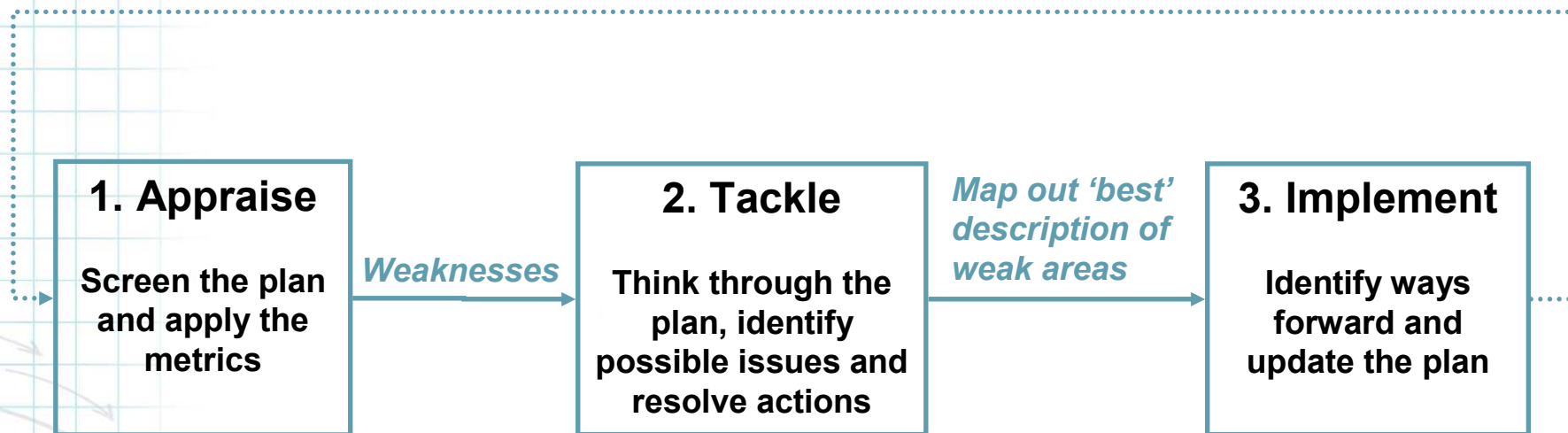
## Information management *The five principles*

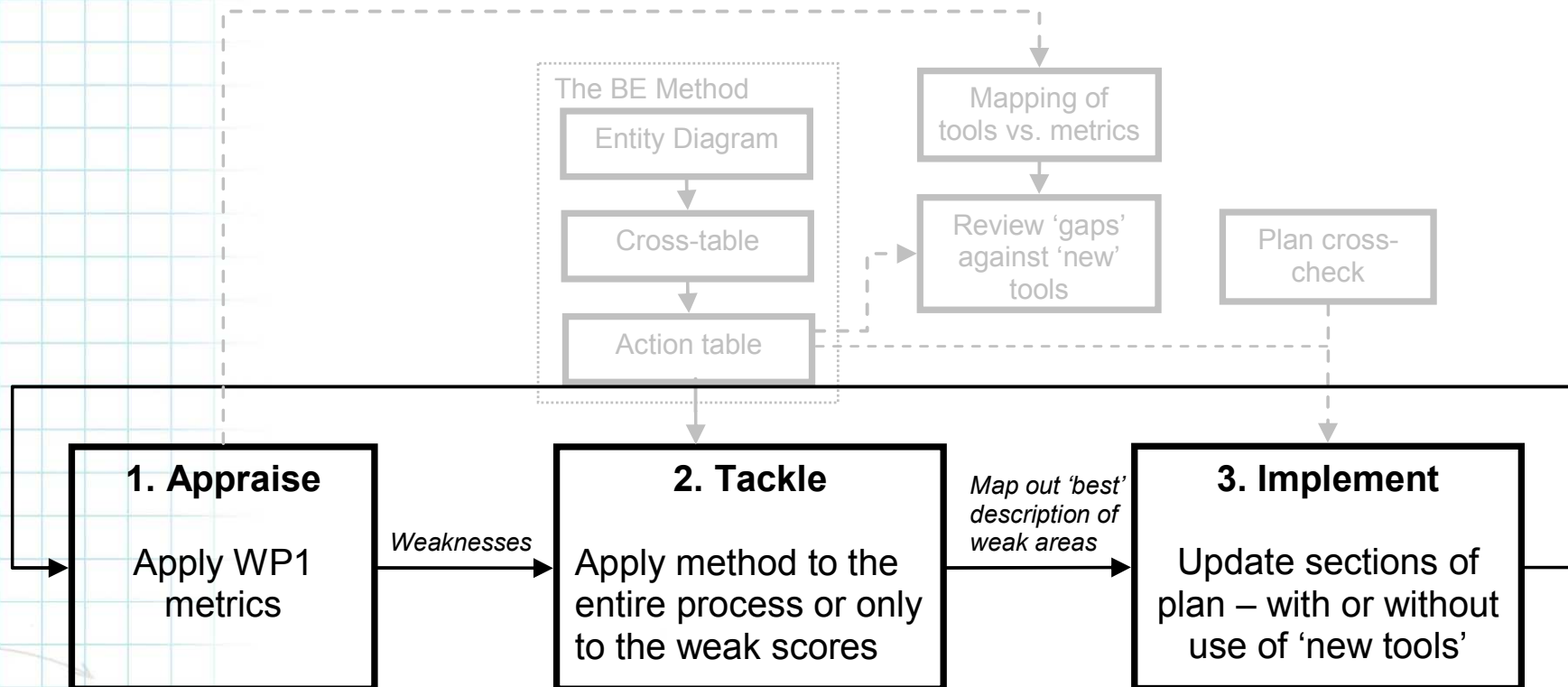


## 1. Appraise

## 2. Tackle

## 3. Implement







# Workshops held in development & application of framework

Date	Location	Country	Plan	Kind of flood	Plan score	Selected metrics	Number of attendees
28 July 2010	Ipswich	England	Multi-Agency Flood Plan (MAFP)	Fluvial and coastal floods	-	1- Details of previous floods 2- evacuation routes	8
11 November 2010	Sheffield	England	Sheffield MAFP	Urban flood and dam failure	2.14	- 1- Risk to vulnerable people 2- Media communication	14
18 November 2010	Dordrecht	Netherlands	Regionaal Basisplan Overstromingen Zuid Holland Zuid, , specifiek Eiland van Dordrecht	Fluvial and storm surges flood (with dikes)	1.7	1- Evacuation 2- Loss of life	7
30 November 2010	Utrecht	Netherlands	Rampenbestrijdingsplan (dreiging) dijkdoorbraak Kromme Rijn dijkkring 44'	Fluvial floods with dikes	2.5	1- Evacuation : communication to the public	3
8 December 2010	Piolenc	France	Plan Communal de Sauvegarde (PCS)	Flash flood and fluvial floods	1.4	1 - Flood warning 2 - Communication with the public	11
4 January 2011	Tarascon	France	PCS	Fluvial floods with dikes	1.78	1 - Flood hazard map 2 - Warning system	11
18 April 2011	Sheffield	England	Sheffield MAFP	Urban flood and dam failure	2.14	1 - Evacuation routes 2 - Loss of life	6

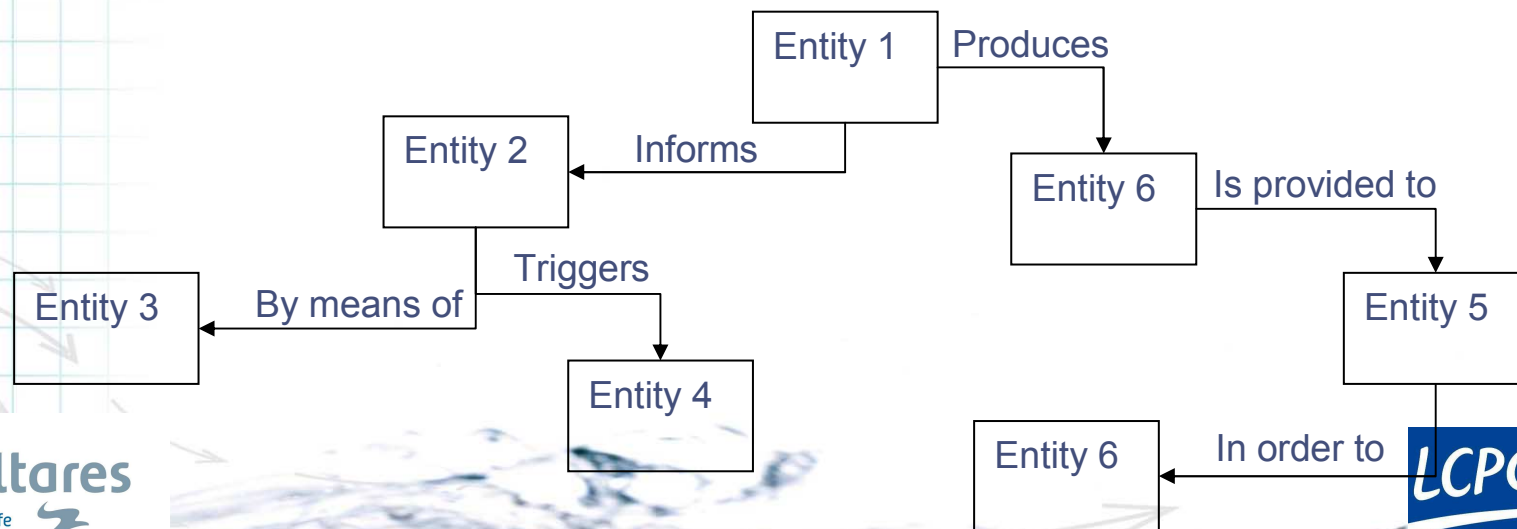
## Entity Diagram

### Boxes

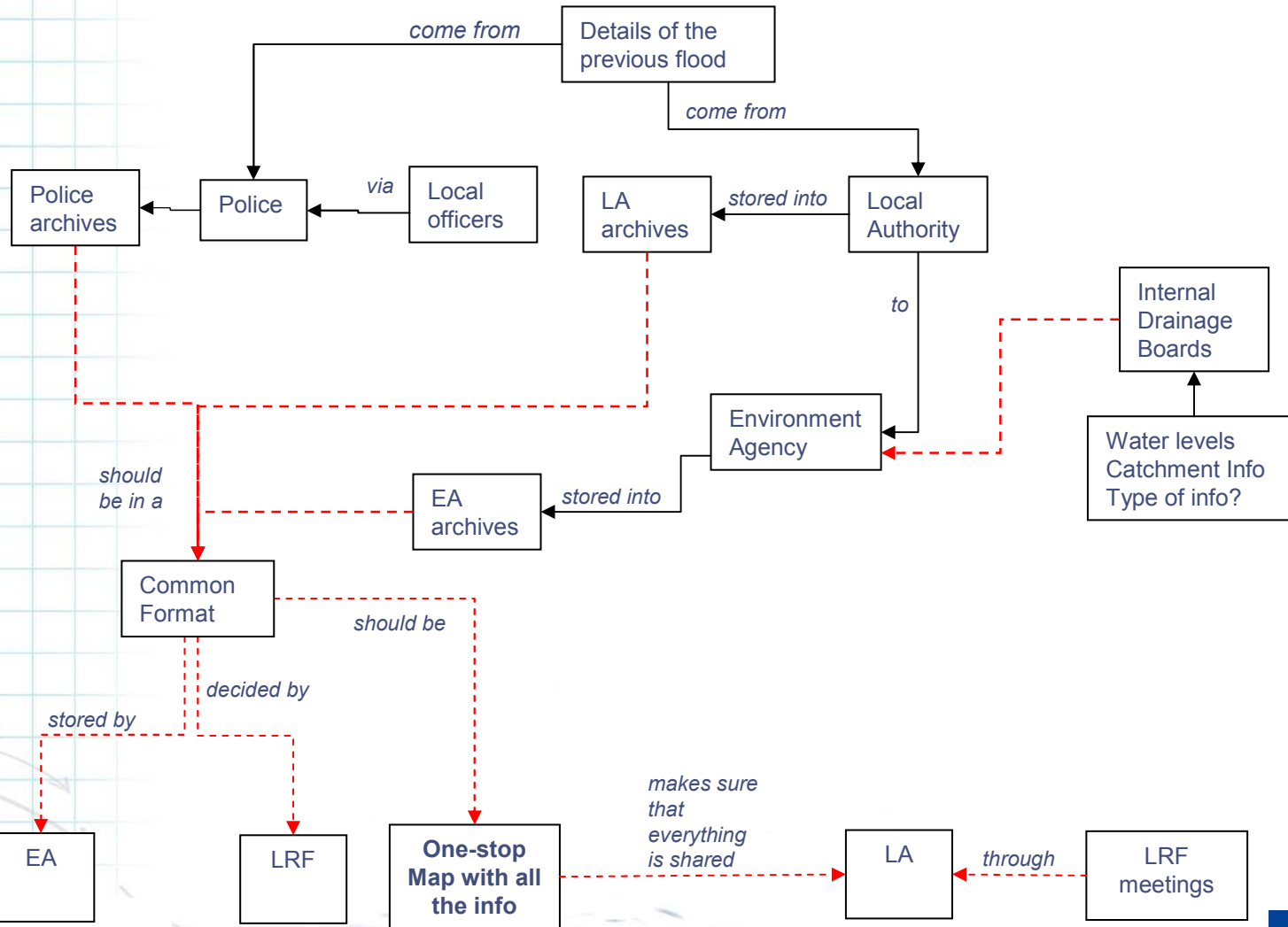
- **Specific entities**
  - abstract (e.g. the warning, plan activation, the recovery, the evacuation..) or
  - physical (e.g. the police, the resources, the SGC, the flood maps..).

### Arrows

- **Relationship between such elements**



# Example of Entity Diagram



## Cross-Table

### Processes & Procedures

Process 1

### Roles & Responsibilities

Role 1

Role 2

### Tools

Tool 1

### Information

Information 1

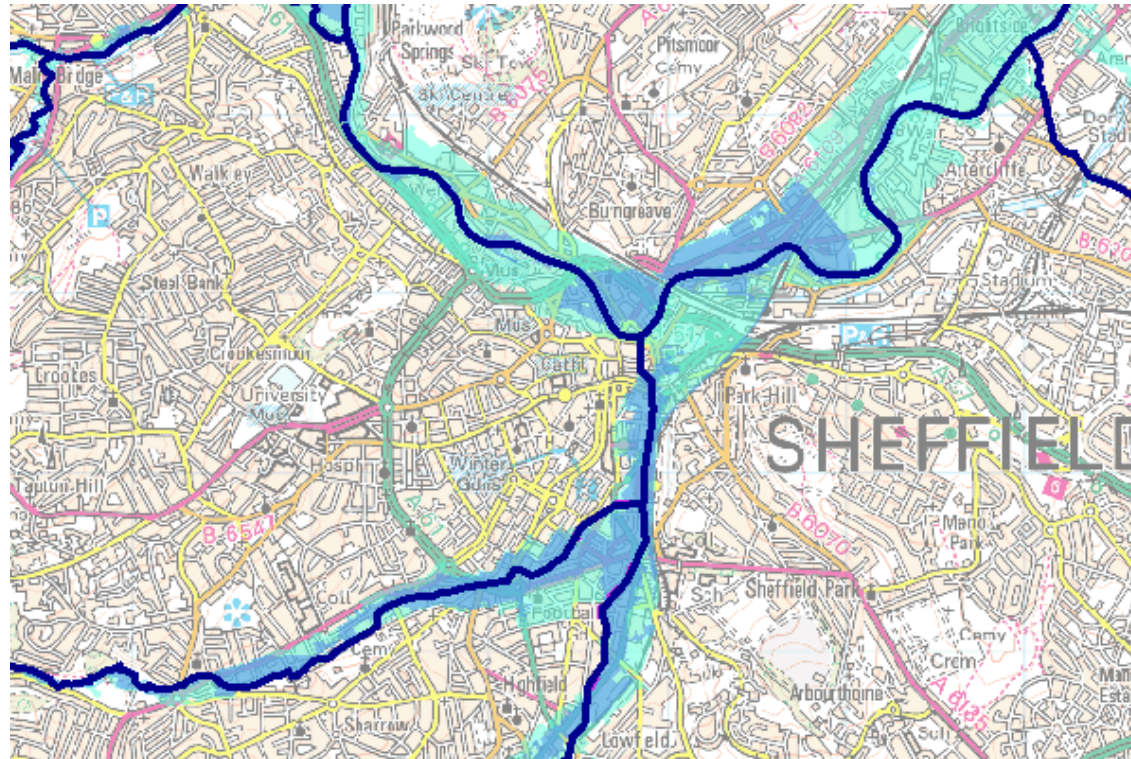
Information 2

Information 3

?

Issues	Tackling actions					Implementation			
	How to address it? Actions	Who should bring it forward? Responsibility	What information is needed?	Is any tool needed?	Who checks this is done? Audit	Priority	Resources	Timeline	Plan to be updated?

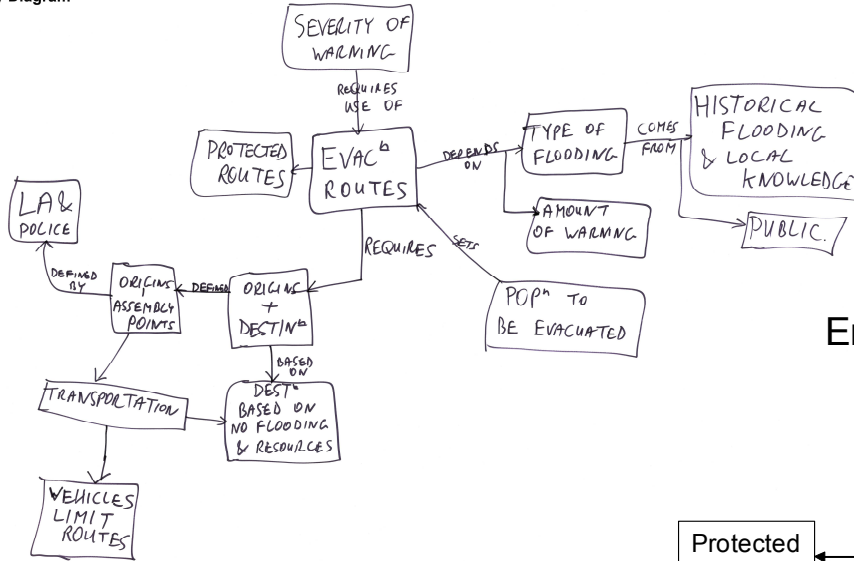




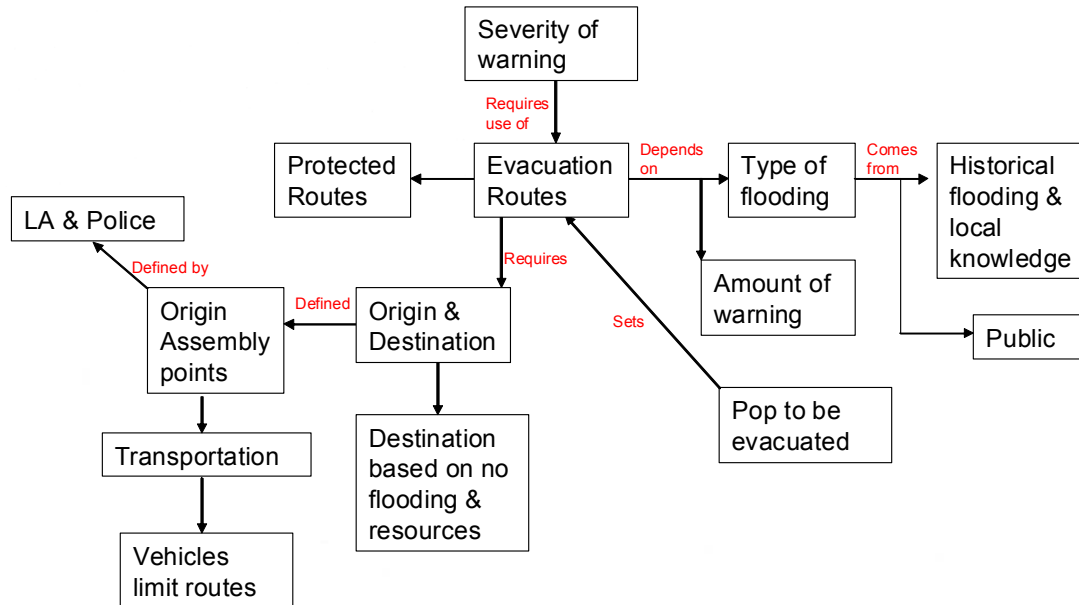
(Source: Environment Agency, 2011)

Communication					
Communication with other agencies		●		2	
Communication with the public		●		2	
Management of the media			●	3	Media management well signposted
Flood warning (if available)			●	3	Clear signposting to location of other maps
Relationship with complementary emergency plans detailed		●		2	
Evacuation					
Evacuation routes	●			1	Consider how to determine 'optimum' evacuation routes, and impact of flood on access
Shelters/Safe havens			●	3	Scored High because policy is not to include this information in MAFP

Entity Diagram

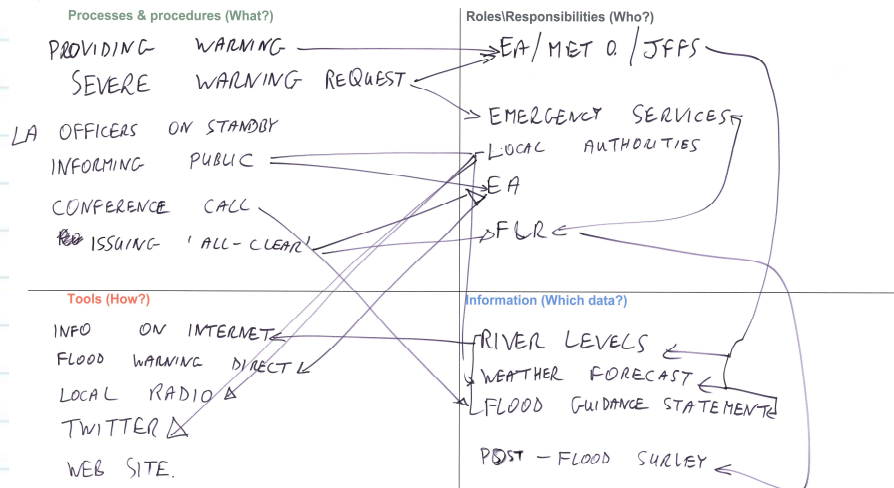


Entity Diagram





# Cross Table for 'Evacuation Routes'



**Processes & procedures (What?)** | **Roles \ Responsibilities (Who?)**

- |                          |                          |
|--------------------------|--------------------------|
| • Providing warning      | • EA / Met Office / JFFS |
| • Severe warning request | • Emergency services     |
| • LA officers on standby | • Local authorities      |
| • Informing public       | • EA                     |
| • Conference call        | • FLR                    |
| • Issuing 'All-clear'    |                          |

**Tools (How?)**

- Info on internet
- Flood warning direct
- Local radio
- Twitter
- Web site

**Information (Which data?)**

- River levels
- Weather forecast
- Flood guidance statement
- Post-flood survey

# Action Table for 'evacuation routes'

## EVACUATION

Issues	How to address it? Actions	Tackling actions			Who checks this is done? Audit
		Who should bring it forward? Responsibility	What information is needed?	Is any tool needed?	
INFORMING PUBLIC	MEDIA MESSAGE	① EA ② M.Ag.	RIVER LEVELS FLUVIAL FORECAST	RIVER MODEL LOOK TO PROVIDE TO TABLES	TCG
	FWD	EA → M.Ag.	REQUEST FROM M.Ag. PARTNERS		EA
	DOOR - KNOCKING	LA / E.S.	PREFERRED DESTINATIONS	GIS SYSTEM	TCG
	WEB.	M. Ag.	" "		TCG
	SIGNAGE.	LA	PREFERRED ROUTES.		TCG
WHERE DO THEY GO?	REST CENTRES	LA	PLUVIAL FORECAST	Y.	
	GET ADDRESS DETAILS	LA / E.S. POLICE	SUITABLE LOCATIONS	GIS / LOCAL K. CO-OPERATION	TCG. LA.

Issues	Tackling actions				
	How to address it? Actions	Who should bring it forward? Responsibility	What information is needed?	Is any tool needed?	Who checks this is done? Audit
Informing public	Media Message	EA M.Ag.	River levels Fluvial forecast	River model	TCG
	FWD	EA to M.Ag.	Request from M.Ag partners		EA
	Door-knocking	LA / E.S.	Preferred Destinations	GIS System	TCG
	WEB	M.Ag.	Preferred Destinations		TCG
	Signage	LA	Preferred Routes		TCG
Where do they go?	Rest centres	LA	Pluvial forecast	Y	
	Get address details	LA / Police	Suitable locations	GIS / Local knowledge	TCG
				Co-operation	LA

Implementation			
Priority	Resources	Timeline	Plan to be updated?
High – to be done 1st	<p>£££££ needed in total. These funds will be provided:</p> <ul style="list-style-type: none"> <li>- ££ from LRF common funding</li> <li>- £ from CC funding</li> <li>- £££ from Defra through the XXX programme</li> </ul>	<p>By the 01.12.2010. Constable Smith to check GIS facilities in the police and arrange for data custodian</p> <p>By the 01.02.2011 Constable Smith to call the Telephone company and agree on sharing data</p> <p>By the 01.03.2011 Mr Brown to seek for update on the data sharing and report back to LRF</p> <p>By the 01.06.2011 Set up the database</p>	NO
High – to be done 2nd	<ul style="list-style-type: none"> <li>- 1 day of the LRF members to attend to the meeting.</li> <li>- 3 days for a Cc EPO to update the plan</li> <li>- 0.5 day for the LRF coordinator to check</li> <li>- 1 day of the LRF members to attend to the 2nd meeting.</li> </ul>	<p>By the 01.06.2011 Mr Brown to arrange a LRF meeting (if not already on schedule)</p> <p>By the 01.07.2011 LRF meeting. Constable Smith to present the GIS layer and their use to the other LRF members. Discuss how to use this info and how to introduce this into the MAFP.</p> <p>By the 01.08.2011 Update the section of the plan as discussed in the LRF meeting</p> <p>By the 01.09.2011 LRF meeting to discuss the updated plan</p>	YES

## Hydrodynamic modelling – TUFLOW

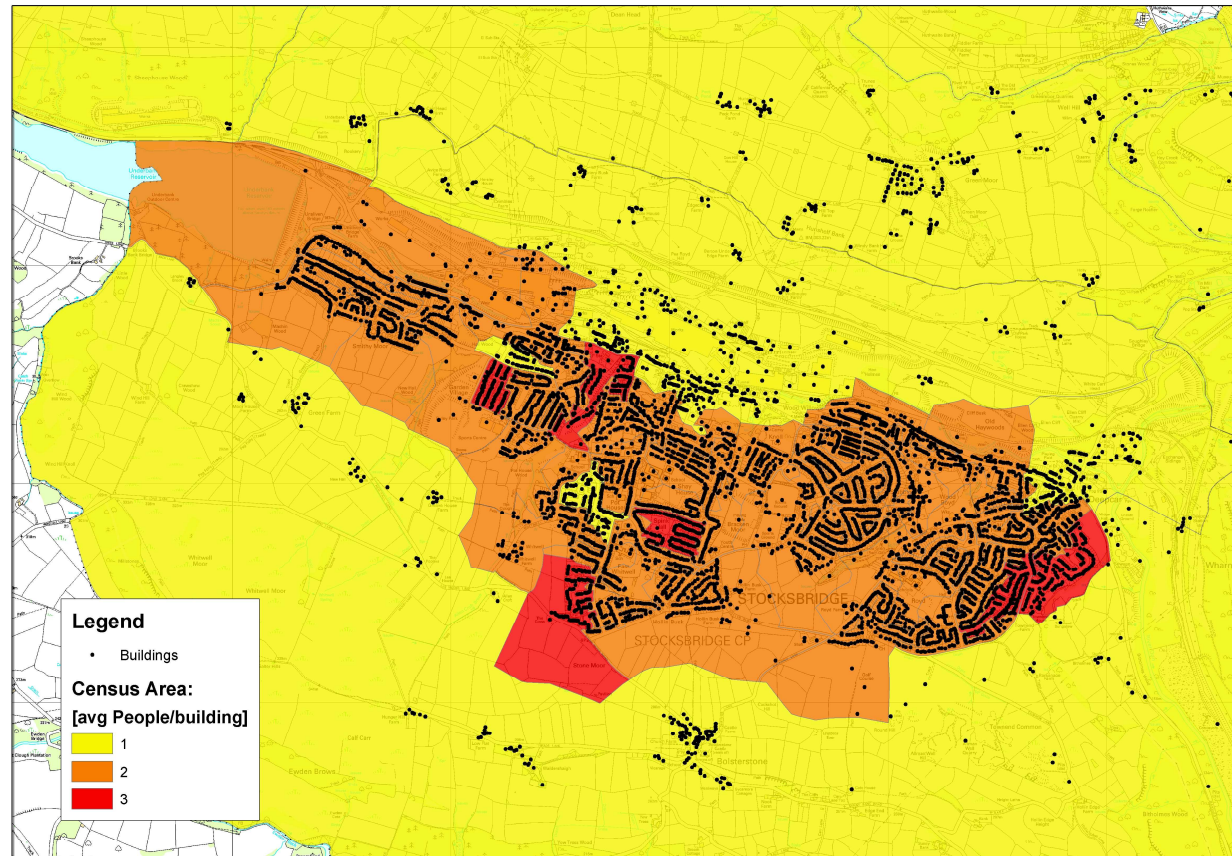
### Breach development

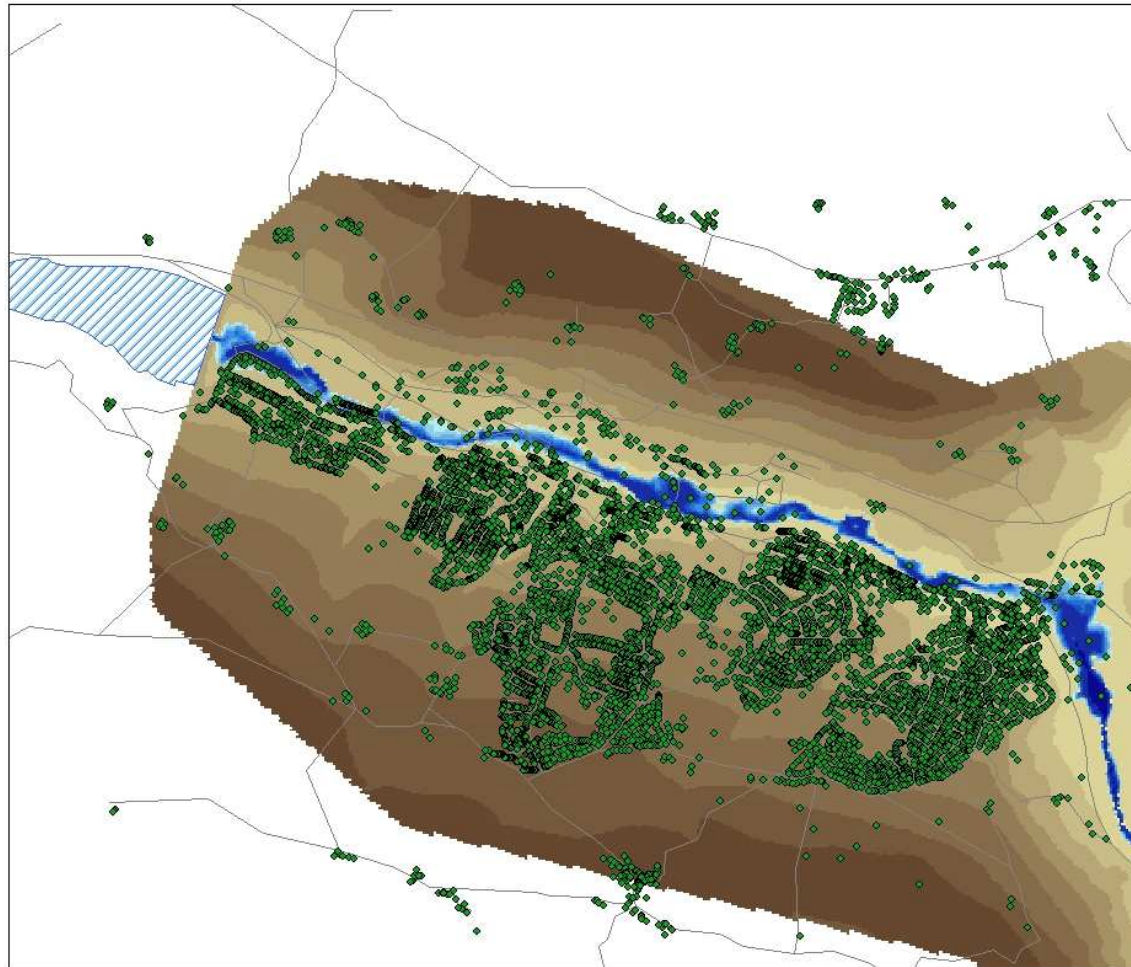
### ‘Flood risks to people’

### Life Safety Model




- Buildings and census areas for the study area




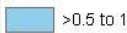








## Fim Frame

Dam break maximum flood depth

-  Reservoir
-  Properties
-  Roads

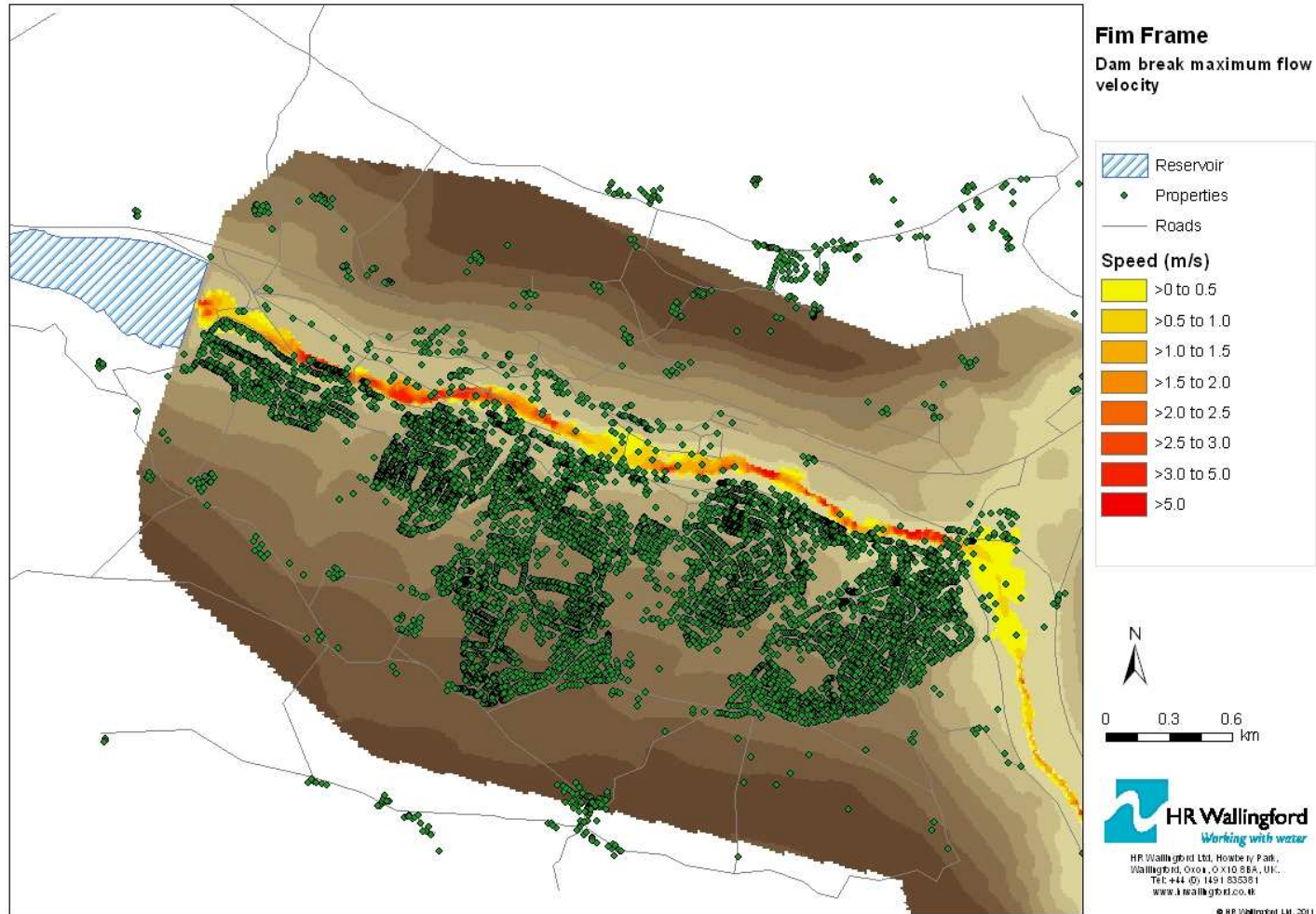
### Depth (m)

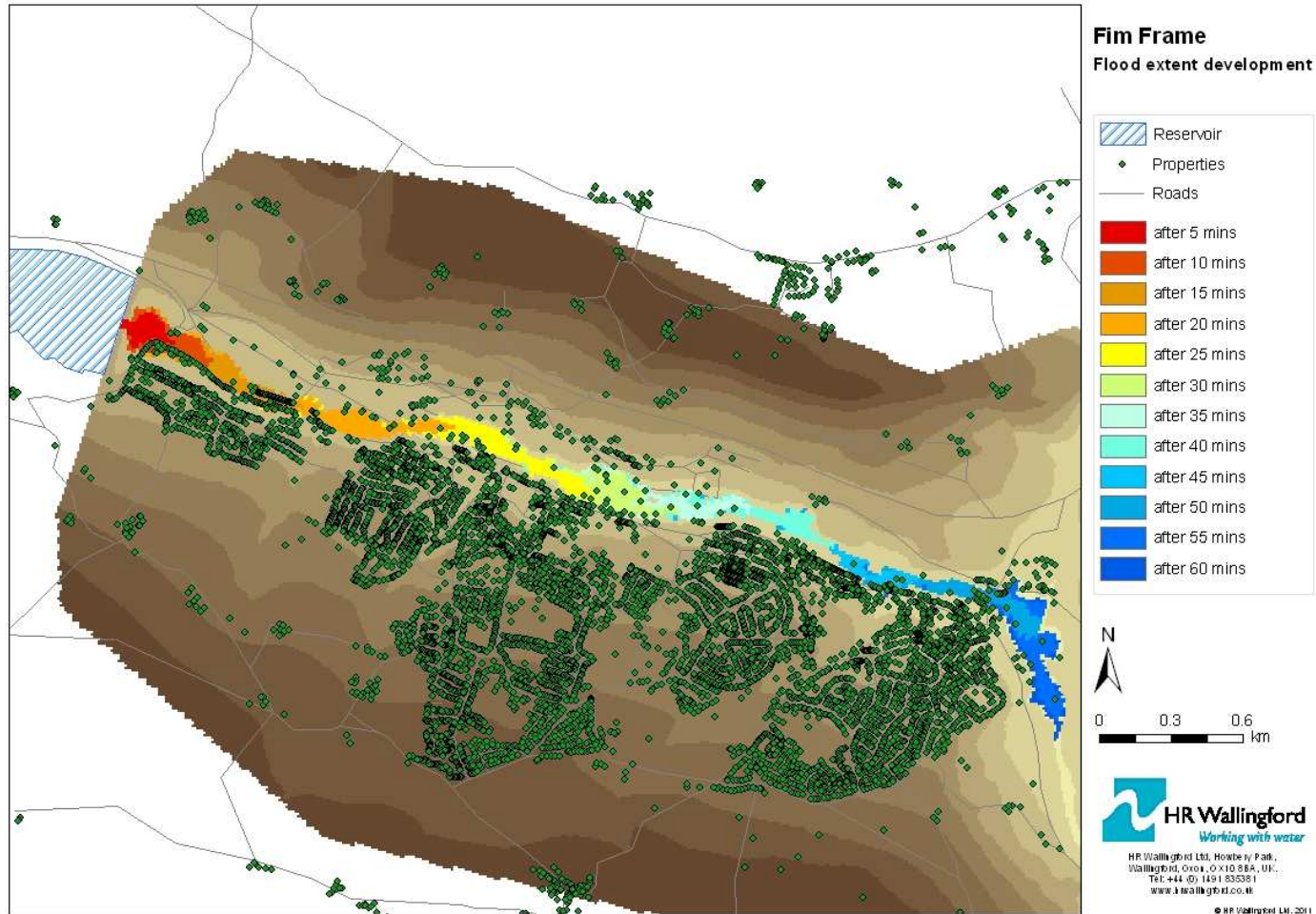
-  >0 to 0.5
-  >0.5 to 1.0
-  >1.0 to 1.5
-  >1.5 to 2.0
-  >2.0 to 2.5
-  >2.5 to 3.0
-  >3.0 to 5.0
-  >5.0



0 0.25 0.5 km









Population		Flood Risk to People		Life Safety Model no warning		Life Safety Model with warning	
		13,836		13,836		13,836	
<b>Deaths</b>	Total	8.5	0.1%*	240 (153)**	1.73% (1.11%)	35 (35)**	0.25% (0.25%)
	Drowning	-	-	150	1.08%	35	0.25%
	Exhaustion	-	-	3	0.02%	0	0.00%
	Building collapse	-	-	87	0.63%	0	0.00%
	Vehicles swept away	-	-	0	0.00%	0	0.00%
<b>Injuries</b>		64.2	0.5%				

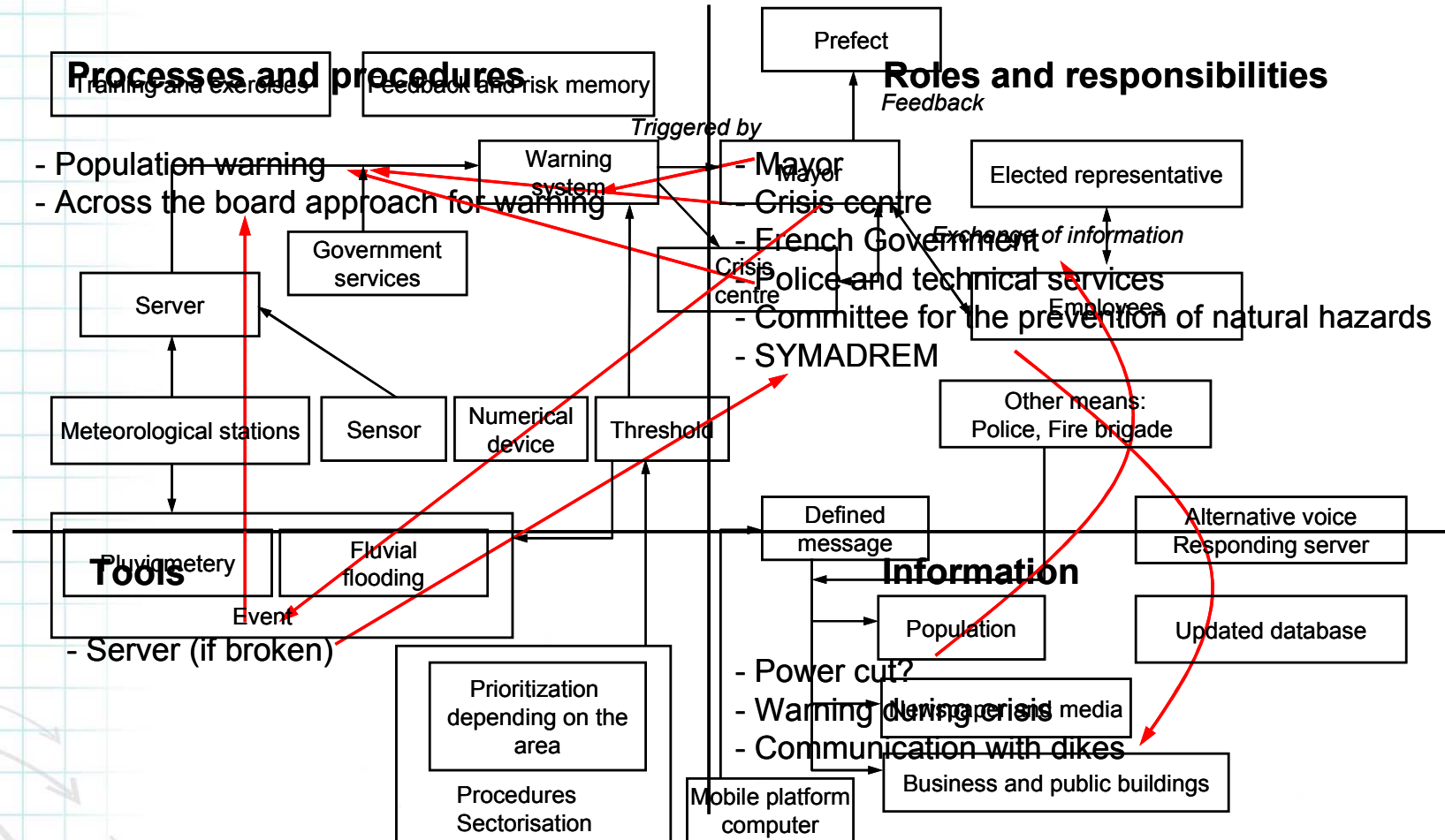
\*percentage evaluated on the total population

\*\*in brackets, the total deaths and percentage if building collapse is not considered.

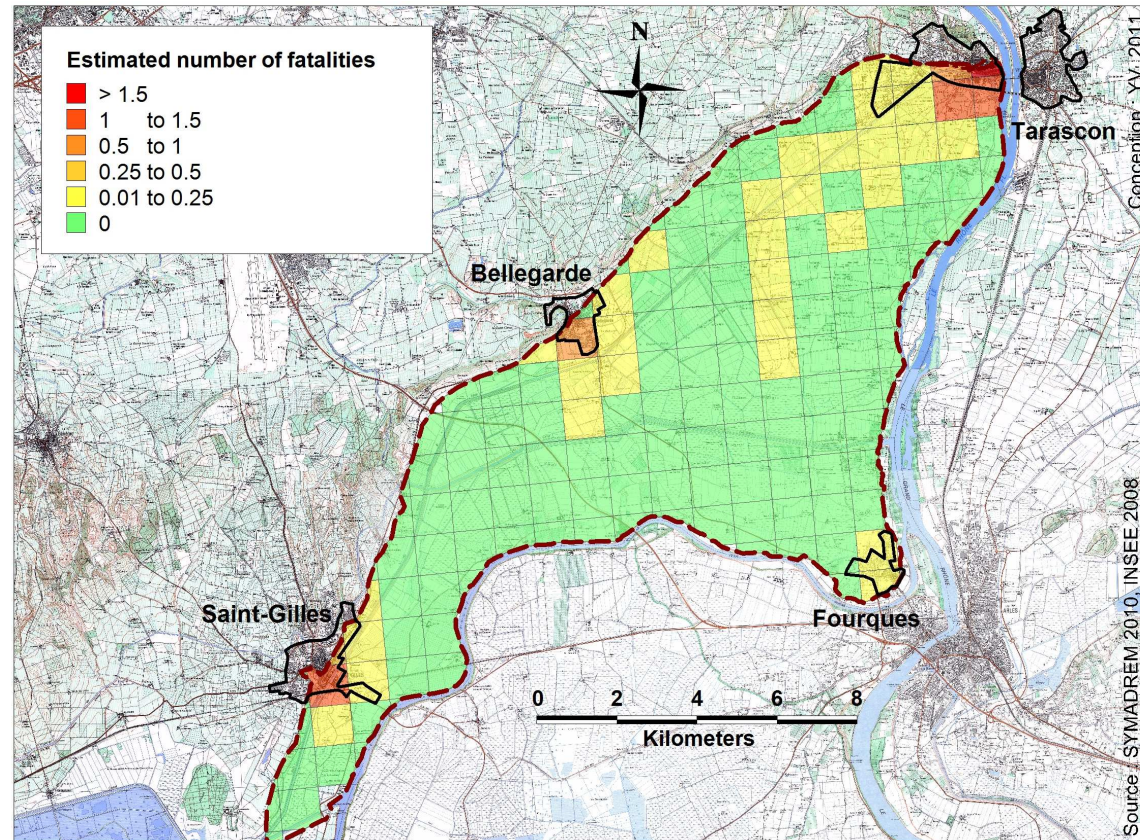


- How to reduce the residual risk of people living in the Segonnaux which is the area between the River Rhone and the dikes;
- The impact of an extreme event (0.1 % probability flood) including breaches in the dike system
- Considered:
  - Flood hazards
  - Flood forecasting & warning

# Entity diagram – flood forecasting

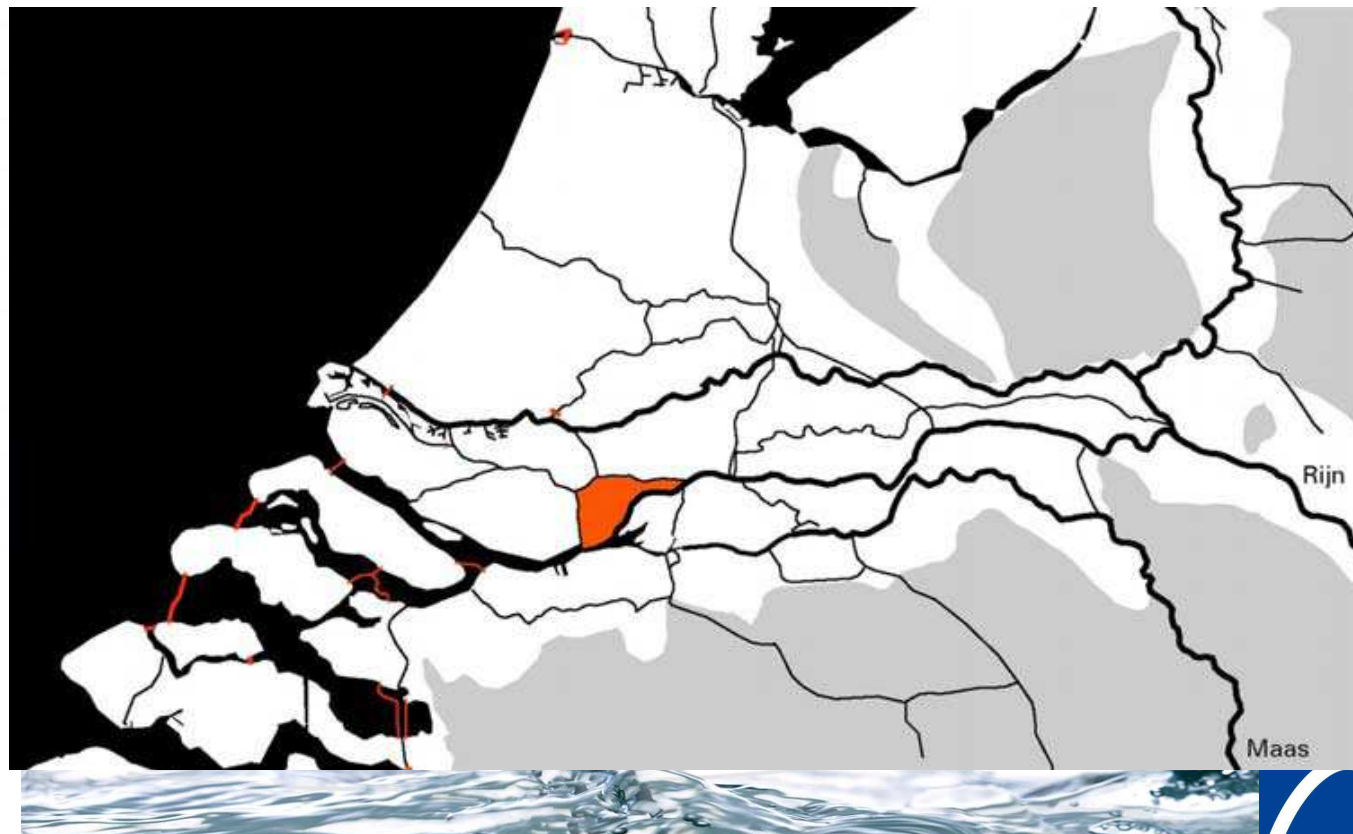


- LiDAR – better topography
- Flood risks to people

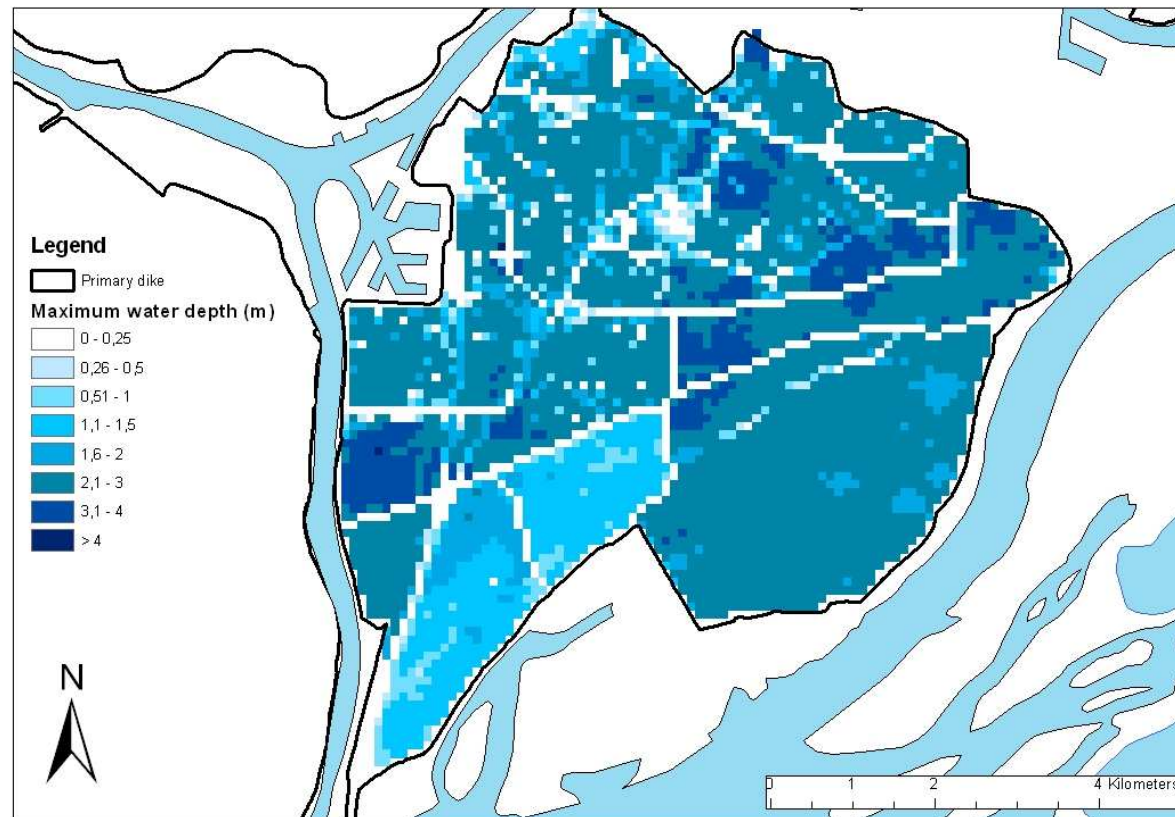


## Evacuation key issue

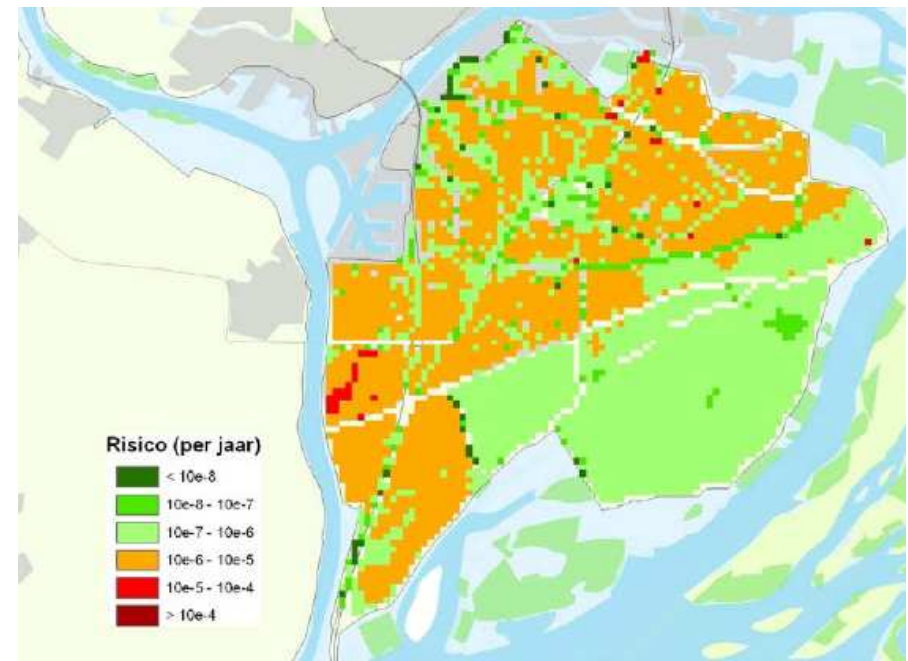
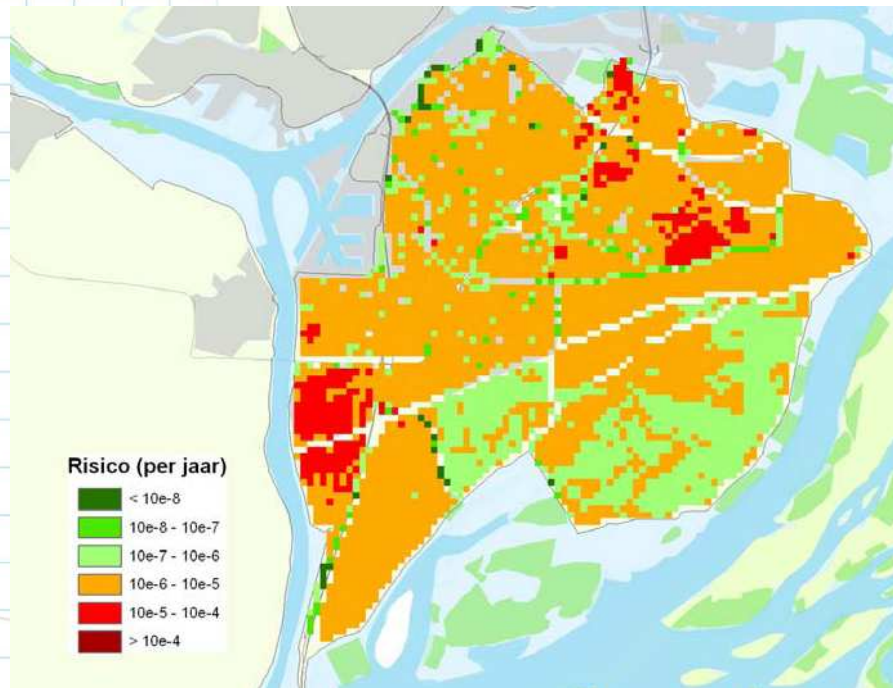
- Consider alternative strategies (e.g. vertical evacuation)



- Compilation of maximum water depths for Dordrecht evaluated for 13 breach locations



- Local individual risk for current strategy (left) and alternative strategy





Case study	Gaps identified	Actions and tools to implement
Sheffield	<ul style="list-style-type: none"> <li>•Gaps in the evacuation process</li> <li>•Dissemination of evacuation message (media, web, door-knocking, signage...)</li> <li>•Places to go (safe havens) and routes to take in case of evacuation</li> </ul>	Models addressing evacuation
Dordrecht	<ul style="list-style-type: none"> <li>•Availability of evacuation routes</li> <li>•Information on demographic numbers; vulnerable groups and to evacuate people</li> <li>•Location of vulnerable people</li> </ul>	To test an alternative strategy of sheltering and evacuation using the Evacuid and RiskTool.
Tarascon	<ul style="list-style-type: none"> <li>•Lack of flood hazard maps for high frequency floods (3% to 10 % probability floods i.e. discharge &lt; 10500 m<sup>3</sup>/s)</li> <li>•Lack of knowledge of potential impacts of extreme events (0.1% floods)</li> </ul>	<ul style="list-style-type: none"> <li>- LIDAR –topographic data</li> <li>- Flood Risk to People model</li> </ul>

## Framework

- Assess plans in an objective way
- Logical & complete
- Ensures no gaps between organisations

## Entity diagram

- Good visualisation of processes
- Somewhat academic
- Can be time-consuming, but experience and examples improves the understanding



## Cross table

- Supports collective vision
- Translates entity diagram into:
  - processes
  - potential 'errors'
  - gaps

- To define the level of detail of the discussion in advance of any workshop
- To list the processes linked to the chosen metric analysed at the workshop in advance of the workshop.
- To make the entity diagrams more simple and more efficient
- To use actual case studies and concrete examples in the workshop
- To put more emphasis on “improving” flood emergency management plans through the better use of available tools and information
- To distinguish between and making the step from “analysing an actual crisis situation” to “defining what needs to be done to improve the plan”.

- There is a demand amongst emergency planners for a simple method to assess existing flood emergency plans as the number of such plans is
- The FIM FRAME method was found by the attendees of the workshops to be a good method to assess their emergency plans.
- The FIM FRAME method helps to facilitate discussions between stakeholders, policy makers and emergency planners. It can bring out both existing problems as well as those that are sometimes ignored
- The workshops allowed gaps in plans to be identified and tools that could help “fill” these the gaps to be identified



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# Outputs and dissemination



Date	Place	Description
September 2009 to date	Sheffield, England	Ongoing dialogue and dissemination with stakeholders in the Sheffield case study area
September 2009	Wallingford, England	Meeting with Environment Agency flood incident staff to discuss the metrics and outputs of project
October 2009	Rome, Italy	Presentation of FIM Frame project at the ERA NET CRUE Rome meeting
October 2009	Not applicable	Project web site <a href="http://www.fimframe.net">www.fimframe.net</a> set up
November 2009	Ipswich, England	Meeting with emergency planners
November 2009 to January 2010	Throughout France	Face to face meetings held with emergency planners to discuss the metrics and the output of the project
November 2009	Throughout the Netherlands	Various face to face meetings with emergency planners held by the project team
December 2009	Paris, France	Meeting held with project partners to disseminate the objectives, direction and outputs of the project
December 2009	Wallingford, England	Meeting with Environment Agency flood incident staff to discuss outputs of project
December 2009	Sheffield, England	Meeting held with stakeholders in Sheffield case study area to discuss the project and disseminate the objectives
January 2010	Throughout the England and Wales	On line survey in English sent to emergency managers
January 2010	Throughout France	On line survey in French sent to emergency planners
January 2010	Throughout the Netherlands	On line survey in Dutch sent to emergency planners
January 2010	Throughout England and Wales	On line survey in English sent to flood risk managers
January 2010	Throughout France	On line survey in French sent to flood risk managers
January 2010	Throughout the Netherlands	On line survey in Dutch sent to flood risk managers
February	Reading, England	Meeting held with Environment Agency staff to disseminate the objectives of the research and the development of the metrics

Date	Place	Description
March 2010	Birmingham, England	Meeting held with UK Project Board to review project progress, particularly the WP1 and WP2 draft reports
May 2010	Not applicable	Production of report detailing WP1 work disseminated to relevant stakeholders
May 2010	Not applicable	Production of report detailing WP2 work disseminated to relevant stakeholders
May 2010	Roche Sur Yon, France	One day meeting with emergency services to discuss the use of enabling technologies and tools in the production of emergency plans for floods
June 2010	Not applicable	Production of note on proposed framework disseminated to relevant end users
June to September 2010	Gard Département, France	Various meetings with emergency managers for the production of PCSs. Report produced and disseminated in France
June to September 2010	Herault Département, France	Meetings with various mayors responsible for emergency planning. Report produced and disseminated in France
June to September 2010	Orb River basin, France	Various meetings with emergency managers for the production of PCSs. Report produced and disseminated in France
June 2010	Throughout France	Short ten page briefing note produced in French to disseminate the results of WP1 and WP2 to French stakeholders
June 2010	Sheffield, England and Wales	Meeting held with the fire service and emergency planners to discuss enabling technologies that could be used in the case study
July 2010	Ipswich, England and Wales	Workshop for testing proposed framework
July 2010	Roche Sur Yon, France	Meeting with emergency planners
August 2010	Not applicable	Paper entitled "Agent-based modelling to inform flood emergency planning and management" accepted for publication in the Journal of Emergency Management
October 2010	Madrid, Spain	Presentation of FIM FRAME project at the ERA NET CRUE Madrid meeting
November 2010	Dordrecht, The Netherlands	FIM FRAME project results presented at the Workshop on assessing the FIM Frame method with stakeholders.
November 2010	Utrecht, The Netherlands	FIM FRAME project results presented at the Workshop on assessing the FIM FRAME method with stakeholders.
December, 2010	Piolenc, France	Workshop on the application of FIM FRAME method on the PCS of Piolenc
January 2011	Tarascon, France	Workshop on the application of FIM FRAME method on the PCS of Tarascon
January 2011	Montpellier, France	Two day conference with 185 participants, who were mostly emergency planners, held at the University of Montpellier III
January/February 2011	Ourika Valley Authority, Morocco	Assessment of flash flood forecasting and management in Ourika Valley. Workshop on applying FIM FRAME method o the flood management issues



Date	Place	Description
February 2011	Not applicable	Submission of a paper on an analysis of loss of life during two recent floods in France to the Natural Hazards Journal
January to July 2011	Tarascon and neighbouring communes, France	Various meetings with emergency managers to discuss tools that could improve the PCSs
March 2011	Mayotte Island, Indian Ocean	Assessment of the tsunami emergency response in Mayotte Island in the Indian Ocean. Meeting with stakeholders based on FIM FRAME method analysis
March 2011	Paris, France	FIM FRAME meeting held in Paris
April 2011	Sheffield, England	Workshop held with Local Resilience Forum in Sheffield
June 2011	Delft, The Netherlands	Presentation of FIM Frame project results at Deltares.
June 2011	Montpellier, France	Public Presentation by research student entitled: "optimisation des PCS et de la gestion du risqué inondation au moyen d'outils SIG dans le Grand Delta du Rhône". at the University of Montpellier and in Tarascon.
June 2011	Not applicable	Four fact sheets produced for the case studies that were carried out
July 2011	Tarascon, France	Face to face meeting in Tarascon to discuss the conclusions of FIM FRAME report
July 2011	Not applicable	Paper entitled "An assessment of flood emergency plans in England and Wales, France and the Netherlands" published in the Journal of Natural Hazards
August 2011	Not applicable	Paper produced entitled "Tools to improve the production of emergency plans for floods – are they being used by the people that need them?" submitted and pending publication in the Journal of Contingencies and Crisis Management
August 2011	Not applicable	Guidance document on FIM FRAME method produced
August 2011	Not applicable	Report on case studies produced
August 2011	Not applicable	Production of the final FIM FRAME report
September 2011	Montpellier, France	Public Presentation of the research report entitled "La submersion marine en Languedoc-Roussillon : analyse de sa prise en compte au sein des Plans Communaux de Sauvegarde" at the University of Montpellier
September 2011	The Netherlands	Article on the project results for a popular Dutch magazine aimed at emergency planners or water managers (in progress)
September 2011	The Netherlands	Presentation of the project results to the Ministry of Transport, Public Works and Water Management
September 2011	London, England	Final workshop with key stakeholders in England and Wales
September 2011	Graz, Austria	Final ERA NET CRUE meeting and presentation at the final conference
October 2011	Throughout Rhone valley, France	General training exercise emergency planning for floods in the Rhone Valley
November 2011	Tarascon, France	Meeting with the Tarascon Commune and the University of Montpellier and local stakeholders to disseminate the FIM FRAME project results
December 2011	France	Translation of guidance document into French

- **WP1 report - The effectiveness and robustness of emergency plans for floods**
- **WP2 report - Comparison of currently available tools and enabling technologies for the emergency planning of floods**
- **WP4 report – Case studies: England, France and the Netherlands**
- **Guidance document for applying the framework – Draft for consultation**
- **Final report**

- An assessment of flood emergency plans in England and Wales, France and the Netherlands, *Natural Hazards*, Volume 58, Number 1, July 2011 , pp. 341-363(23)
- Tools to improve the production of emergency plans for floods – are they being used by the people that need them? *Journal of Contingencies & Crisis Management*
- Peer reviewed paper to be produced on the framework
- A comparison of the causes, effects and aftermaths of the coastal flooding of England in 1953 and France in 2010 *Natural Hazards Earth Systems Science*, 11, 2321-2333, 2011
- A comparative analysis of the loss of life during two recent floods in France: The sea surge caused by the storm Xynthia and the flash flood in Var, *Natural Hazards*

www.fimframe.net



The screenshot shows the 'Dissemination' page of the FIM FRAME website. At the top, there is a navigation menu with 'Home', 'Project', 'Partners', and 'Dissemination'. The main heading is 'Dissemination'. Below this, there is a section titled 'FIM FRAMEWORK Dissemination'. A sub-heading reads 'FIM FRAME reports and publications are published here:'. To the left of the text are three small images: a flooded town, a person wading through floodwaters, and a large sandbagged breach in a dike. The text on the right lists several publications and reports, each with a brief description and a link to the document. The list includes a joint research project fact sheet, a poster presented in Rome, a start-up meeting presentation, two reports on emergency plans for floods, a questionnaire in French, an interim report, an interim meeting presentation, an assessment of flood emergency plans in England and Wales, France, and the Netherlands, and a paper on crisis management plans for floods in England, France, and the Netherlands. At the bottom of the page, it says 'Last updated: March 2011'.

Home Project Partners Dissemination

## Dissemination

### FIM FRAMEWORK Dissemination

FIM FRAME reports and publications are published here:

- [FIM FRAME joint research project fact sheet](#)  
includes project outcomes, duration, costs (.pdf)
- [FIM FRAME poster](#)  
presented in Rome in October 2009 (.pdf)
- [Start up meeting presentation](#)  
presented in Rome on 21 October 2009 (.pdf)
- [WP1 report - The effectiveness and robustness of emergency plans for floods](#)  
finalised in June 2010 (9.6 MB .pdf)
- [WP2 report - Comparison of currently available tools and enabling technologies for the emergency planning of floods](#)  
finalised in June 2010 (5.4 MB .pdf)
- [Questionnaire dans le cadre du programme de recherche FIM FRAME. Premiers enseignements](#)  
results from the questionnaires carried out as part of the research in French (.pdf)
- [FIM FRAME - Interim report](#)  
produced in September 2010 (.pdf)
- [Interim meeting presentation](#)  
presented in Madrid on 18 October 2010 (.pdf)
- [An assessment of flood emergency plans in England and Wales, France and the Netherlands](#)  
peer reviewed paper published in Natural Hazards, December 2010. [Visit journal website.](#)
- [Une évaluation des plans de gestion de crise « Inondations » en Angleterre, en France et aux Pays-Bas](#)  
paper presented at the seventh Colloque Géorisque, Montpellier, France, January 2011 in French (.pdf)

Last updated: March 2011



HR Wallingford  
*Working with water*



# Questions?

