

Risk Assessment and Critical Infrastructure Protection in Health Care Facilities: Reducing Social Vulnerability

Christoph Riegel

2007 Summer Academy

Megacities: Social vulnerability and resilience building



STOP DISASTERS!

A disaster simulation game from the UNISDR

ISDR
International Strategy
for Disaster Reduction

PLAY GAME HIGH-SCORES INFORMATION WHAT IS THE ISDR? FAQ PRESS

Language

OVERVIEW KEY FACTS: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 START DISASTER

BUDGET \$50,000 POPULATION 550 MAP SHOW RISK DIFFICULTY EASY

REMAINING	\$47,710	UNHOUSED	44
HOUSING	\$2,290	HOUSED	506
DEFENCES	\$0	SHELTERED	0

DISASTER FLOOD
PROBABILITY ↑
SCORE 0001340

Internet 100%

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OVERVIEW KEY FACTS: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 START DISASTER



BUDGET	\$50,000	POPULATION	550	MAP	SHOW RISK	DIFFICULTY	EASY
REMAINING	\$40,500	UNHOUSED	3			DISASTER	FLOOD
HOUSING	\$9,500	HOUSED	547			PROBABILITY	
DEFENCES	\$0	SHELTERED	0			SCORE	0005380

Internet

100%

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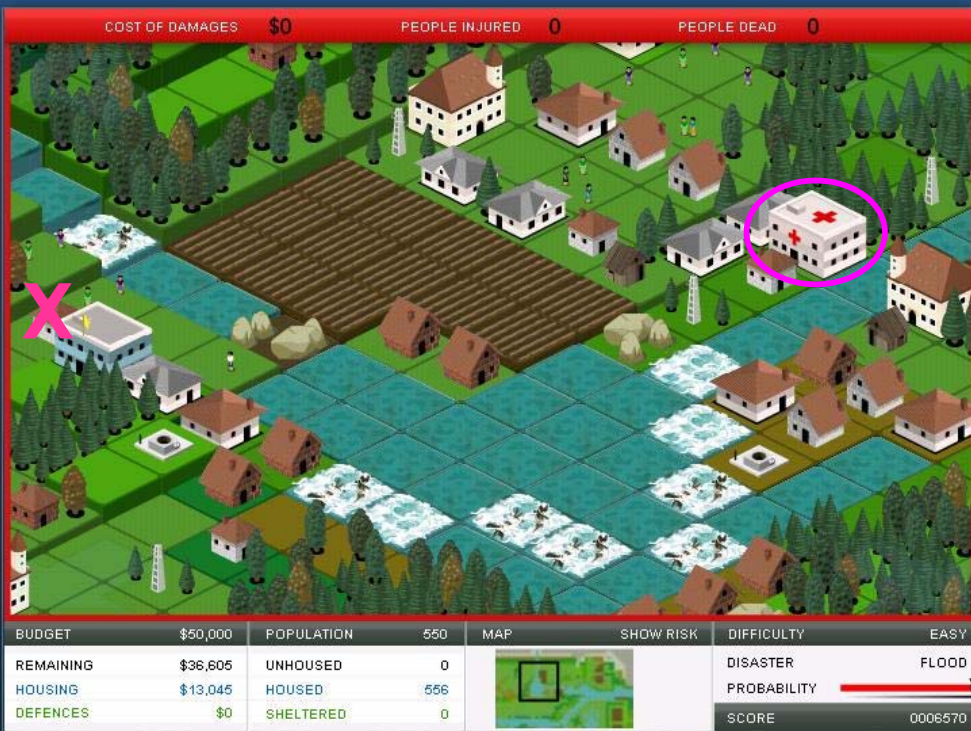
WHAT IS THE ISDR?



FAQ

PRESS

Language     

COST OF DAMAGES \$0 PEOPLE INJURED 0 PEOPLE DEAD 0



BUDGET	\$50,000	POPULATION	550	MAP	SHOW RISK	DIFFICULTY	EASY
REMAINING	\$36,605	UNHOUSED	0			DISASTER	FLOOD
HOUSING	\$13,045	HOUSED	556			PROBABILITY	
DEFENCES	\$0	SHELTERED	0			SCORE	0006570

Internet

100%

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COST OF DAMAGES **\$11,832** PEOPLE INJURED **235** PEOPLE DEAD **15**

BUDGET	\$50,000	POPULATION	550	MAP	SHOW RISK	DIFFICULTY	EASY
REMAINING	\$36,605	UNHOUSED	0		DISASTER	FLOOD	PROBABILITY
HOUSING	\$13,045	HOUSED	556				
DEFENCES	\$0	SHELTERED	0				
SCORE						0006570	

Internet

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COST OF DAMAGES **\$27,650** PEOPLE INJURED **238** PEOPLE DEAD **16**

DAILY NEWS POST

\$1 *undefined 10 July 2007*

Flash Floods!

Earlier today a flood washed in over this small community in eastern Europe. With no evacuation plans people were taken by surprise as the flood swept over their community causing massive damages and casualties. A survivor reported "We have a community centre designed to shelter people as we are aware of the dangers of living in a flood plain but this time there was no warning whatsoever." Homes in this small community suffered enormous damage currently estimated at \$27,650 Most recent estimates show the death toll has raised to 16 and a further 238 seriously injured Questions are already being asked about the local hospital's poor planning, which may have led to its destruction and the loss of many patients. We have launched a full investigation into the poor planning. Our recently appointed town planner has been suspended pending the results of the report."

In other news...

[View Scene](#)
[View Report](#)

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COST OF DAMAGES \$27,650 PEOPLE INJURED 238 PEOPLE DEAD 16

MISSION REPORT



CLASSIFIED

HOUSING AND DEVELOPMENT

BUILDINGS DESTROYED	50	TOTAL DAMAGES	\$27,650
POPULATION HOUSED	556/550	POPULATION DIED	16
POPULATION SHELTERED	0	POPULATION INJURED	238

MISSIONS

SCHOOL BUILT	PASS	HOSPITAL BUILT	PASS
		HOSPITAL DESTROYED	-1000

SCENARIO MISSION : PROTECT THE WATER SOURCES BY COVERING WE LS : FAIL

BONUS

KEY FACTS FOUND	3	BUDGET REMAINING	\$36,605
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FINAL SCORE : 0


continue...

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REMAINING	\$36,605	UNHOUSED	0			DISASTER	FLOOD
HOUSING	\$13,045	HOUSED	556			PROBABILITY	
DEFENCES	\$0	SHELTERED	0			SCORE	0000000


Core questions

1. What makes infrastructure vulnerable and critical?
2. How can risk management be organized in this context?

Interdependency



Example of Applying the 5 Ws



**Electric Power
Dependence on Water**

Who: Municipal Water Company, Bill Waters, 866-222-9222


What: Water, 2 gal/min

Why: Maintain 1000 amp transformer output to meet demand

Where: Transformer (Latitude: 47.15 Longitude: -122.52)

When: Between 4-6 pm June, July & Aug

Source:
www.TISP.org



NAVSEA HOMELAND AND FORCE PROTECTION

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Interdependency

Hospitals	Energy	Water	Specialized staff	ICT	Transport	Average
Internal services						
Diagnosis	4	3	4	4	2	3
Treatment	4	4	4	3	3	4
Documentation	4	1	4	4	1	3
Account	4	1	4	4	1	3
Nursing	4	4	4	2	3	3
Pharmacy	4	4	4	3	4	4
Transport of persons	3	1	2	1	4	2
Courier service	2	1	2	2	4	2
Food logistics and preparation	4	4	3	2	4	2
Average	4	3	3	3	3	3

Legend	Category	Dependence
	1	Very low
	2	Low
	3	Medium
	4	High
	5	Very high

Source: own elaboration

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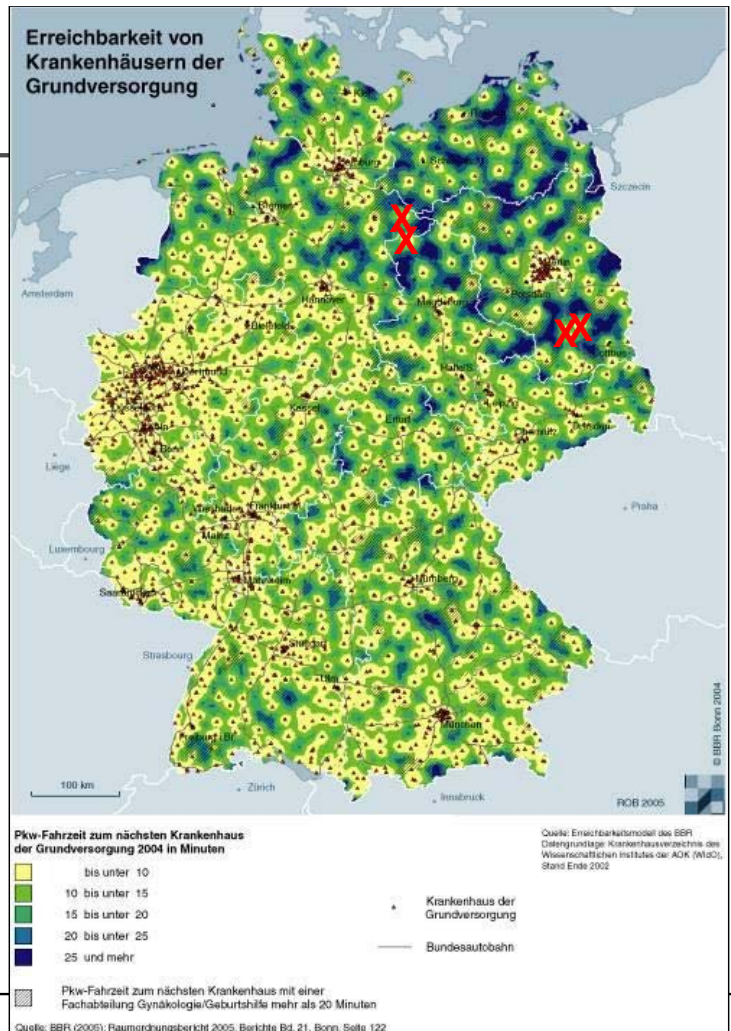
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Accessibility of hospitals:

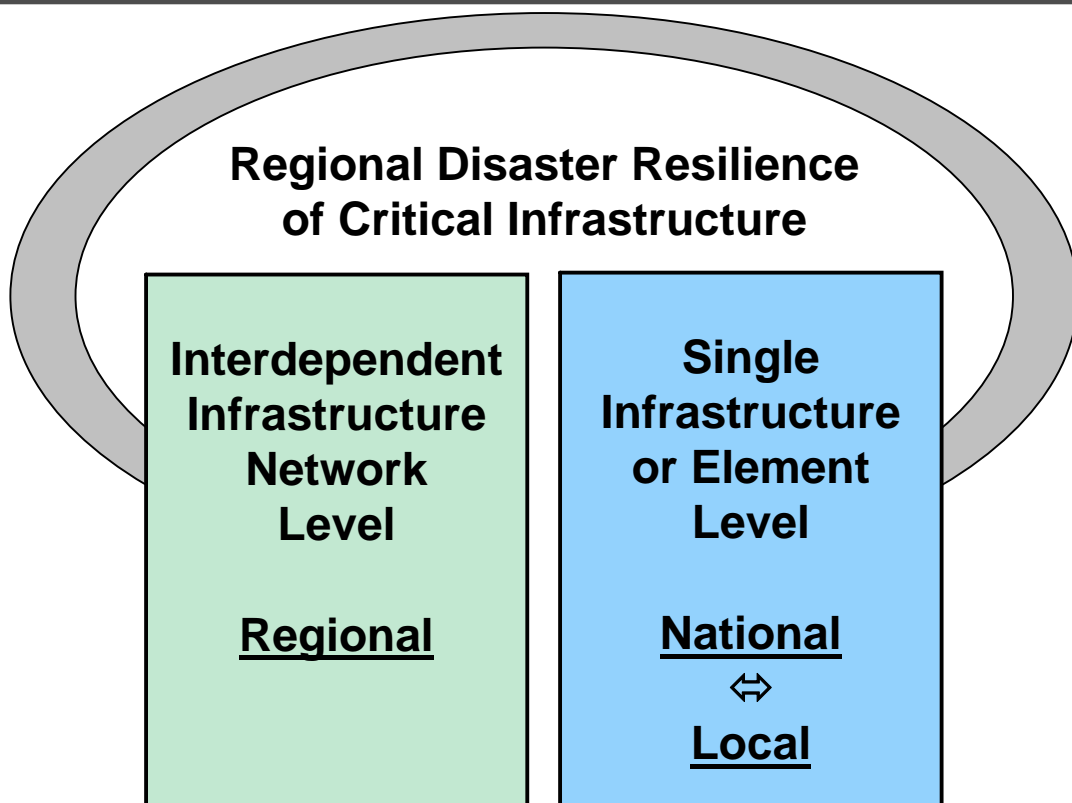
Journey-time to next
hospital of primary health
care in minutes

Source: Bundeamt für Bauwesen und Raumordnung

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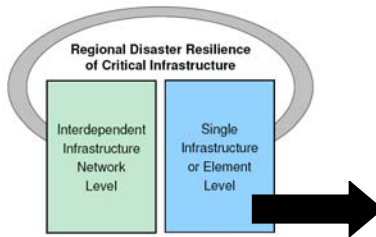


Two complementary approaches



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Two complementary approaches



Single infrastructure or element level

Provide advice to CI operators on how to implement effective risk and crisis management processes

- Prerequisites of RM process
- Definition of protection goals
- Self assessment of criticality, hazard scenarios and vulnerability
- Derivation of protection measures

Individual responsibility for facility resilience!



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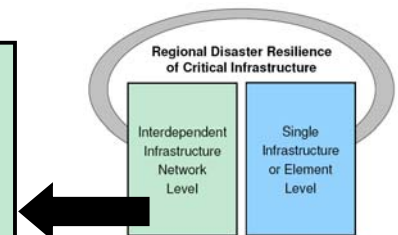
Two complementary approaches

Regional Disaster Resilience

Initiate informal or formal cooperation of Infrastructure operators, public administration, associations, etc.

- Assessment of regional disaster risks and communication of sectoral vulnerability
- Development of cooperative protection measures

Collective responsibility for interdependencies!



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Danke für Ihre Aufmerksamkeit!



Christoph Riegel

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