

2nd Nordic International Climate Change Conference

Governing adaptation to natural hazards in land-use planning

Trude Rauken and Asbjørn Aaheim

CICERO

Norway

Helsinki, August 30, 2012

Knowledge gaps in management of natural hazards

We know:

- Natural processes and consequences
- Most human responses can be explained when put in context
- Decision making processes leave a big space for escaping responsibility

ISO 31 000: Quantitative assessments can still be improved, but **qualitative** assessments are equally important. Risk management needs to be integrated into the decision making processes

SREX: Management of natural hazards is a national responsibility, where the social and human dimensions need to be integrated

But:

- Few studies address **how** to integrate the different dimensions

Why would anyone restore this house once the flood is over?



Source: Heggelund/SCANPIX

...but they will, and they do – so are they fools?

How are the losses compensated?

Country	Arrangement	Risk vs premium
Denmark	Compulsory private insurance (connected to fire insurance). Ultimate state guarantee	Independent
Finland	Private optional system. Compensation for natural hazard damages are offset annually on governmental budgets. Also a case-to-case evaluation	Private is dependent. Public is independent
Norway	Compulsory private insurance (connected to fire insurance). Assets outside the private insurance domain guaranteed by a state fund	Independent
Sweden	Private bundled system. No state guarantee, but compensations are given on an ad-hoc basis	Independent

...the citizens may expect to be partly or fully compensated

Roles and responsibilities

Private developer: Economic losses are compensated.

Permission for development is given by the municipality. What is the risk of life and health?

Municipalities: The national level compensates economic losses. Give permissions on the basis of an evaluation of possible (local) economic risks and risks on life and health.

National level: Make sure that municipalities include also the economic risks that will be compensated by the state in case of an event

HOW to do this?

Natural hazards and land use planning



Awareness at the national level

Example A: Two people killed in an avalanche in an alpine ski resort winter 2011. The Minister of Environment is asked what can be done to avoid this in the future?

The minister: «Put up protection walls where the avalanche occurred. Besides, the municipalities need to be more careful in developing these resorts, and take more responsibility»

Example B: Flood in Eastern Norway spring 2011. Insurance companies complain about houses that are being built within flood zones. The Minister of Justice is asked for a comment.

The minister: «Is this supposed to be the message to people who have just lost their homes?»

Formalization of the government's problem

- The municipality knows that compensation is paid *ex post*. They include it in their prior evaluation of risk, and impose less prior efforts to avoid losses
- The national government has insufficient information to dictate the appropriate level of efforts – the correspondence between risk and efforts is the municipality's «private information» => Moral hazard
- How can the national government encourage high efforts in municipalities?

	Prior evaluation		Efforts		Probabilities			Out-come		Post evaluation		Trans-fer
					Broad	Narrow						
Broad	$\psi^{\text{ex ante}}$	→	e_H	→	π_H	$1 - \pi_H$	→	d	→	$\Psi^{\text{ex post}}$	→	t_H
Narrow	$\Phi^{\text{ex ante}}$		e_L		π_L	$1 - \pi_L$	→	D	→	$\Phi^{\text{ex post}}$	→	t_L

π_H = Probability that high efforts in municipalities is based on a broad evaluation

π_L = Probability that low efforts in municipalities is based on a broad evaluation

Conclusions

- In countries where damages for natural disasters are compensated independent of the private evaluation of risk, it is a national responsibility to assure that damages do not exceed what can be expected on the basis of prior knowledge
- The social costs of a national guarantee may very well be lower than the exceeding costs related to moral hazard, which follows from such a guarantee
- Unawareness of the moral hazard issue, national efforts to increase security, such as improvement of warning systems, may increase losses of natural hazards
- The government may reduce the cost related to moral hazard by ex-post evaluations of local efforts
- It is still a problem that developments with negative expected values in a national context may be considered valuable to a municipality