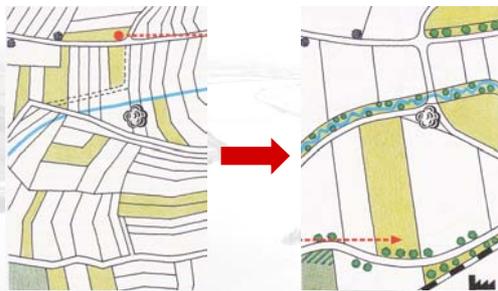


Changes in Land Tenure Arrangements



Map of old parcels

Map of new lots

Development of Land Consolidation

Traditionally:

Promoting efficient agriculture and forestry by assembling economically viable units of land in rural areas

Nowadays:

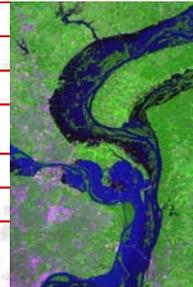
Land conservation and nature protection, village-renewal projects and **flood protection**

Types of Land Consolidation in Germany

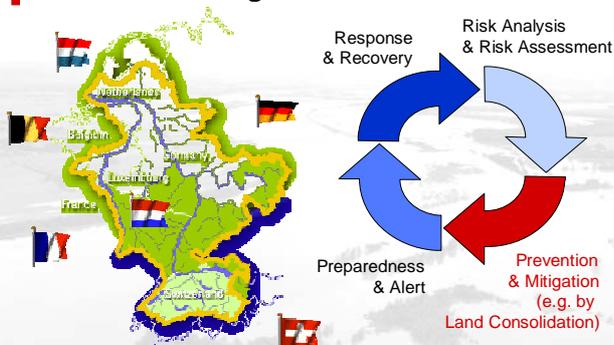
- **Comprehensive LC Procedure**
(Sections 1-37, LCA)
- **Simplified LC Procedure**
(Section 86, LCA)
- **LC Procedure in Case of Permissible Compulsory Acquisition**
(Section 87, LCA)
- **Accelerated LC Procedure**
(Section 91, LCA)
- **Voluntary Land Exchange**
(Section 103a LCA)

LC as a Tool of Flood Risk Prevention

- Relocation of dikes
- Increase of water storage capacity
- Redevelopment of flood plains
- Renaturalization of rivers, restoration of small streams
- Restriction or limitation of sealed surfaces
- Change of land utilisation
- Restoration and creation of additional retention area to cause a diminution of the high water levels



Flood Risk Management



Contribution of Surveyors

Applications of geodetic methods, techniques and procedures concerning LC:

- (1) Geodetic engineering/photogrammetry and remote sensing
- (2) Data processing/Geographic Information Systems (GIS)
- (3) Rural planning and land management



(1) Surveying and Photogrammetry

- Establishment of fixed boundary marks
- Photo flight of the land consolidation area
- Determination of new property boundaries
 - Tacheometry
 - GPS Technology
- Drawing up of new cadastral maps
- Establishment of digital stereo photogrammetry
- Updating of the public records

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(2) Geographic Information Systems

- Creation and installation of GIS (input, store, retrieve, manipulate, analyze and output geospatial data)
- Digitalization of land register maps
- Editing geodata adapted for the use as geoinformation data for specialized users

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(3) Rural Planning and Land Management

- Moderation/mediation
- Reshaping the land consolidation area
- Development of the land consolidation plan
- Determination of the compulsory land compensation

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Example: Land Consolidation „Langer Bogen“

- Land Consolidation Procedure in Case of Permissible Compulsory Acquisition
- Objectives:
 - Reshaping the area
 - Creation of new path network
 - Sustainable flood protection
 - Landscape conservation

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Aerial View of „Langer Bogen“

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Land Consolidation Area: Cadastral Map

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Existing, Insufficient Dike



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Existing Road and Path Network



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Working Plan: Land Consolidation Procedure

Type of Land Consolidation Procedure	Section 87 LCA
Size of Land Consolidation Area	150 hectares
Parties Concerned	300
Land Consolidation Decision	1998
Determination of Boundaries	1999
Valuation of the Parcels	2001
Drawing up of Land Consolidation Plan	2002
Updating Public Records	approx. 2006

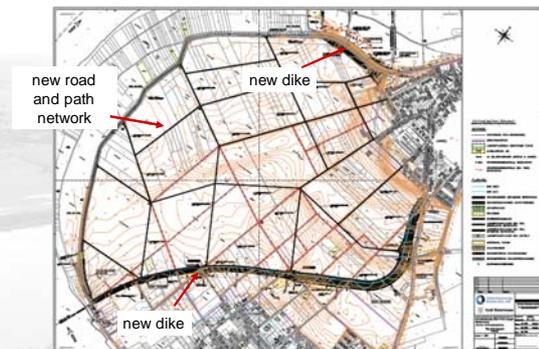


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Reshaping of the Land Consolidation Area



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Flood Prevention Measures

Technical flood protection measures:

- Dike relocation
- Construction of a new dike
- Creation of extra overflow area with a retention capacity of 4.5 million m³

Ecologically orientated flood protection:

- Restriction of sealed surfaces
- Path network to leak water
- Changes in land-use



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Conclusions

- Land Consolidation can be used as a highly effective instrument in rural areas to improve flood protection.
 - Technical flood protection measures
 - Ecologically orientated flood prevention strategies
- LC procedure always must recognize the need for diverse local solutions.
- Especially the Surveyor can contribute extremely to the success of a LC procedure!



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Thank you very much for your attention!



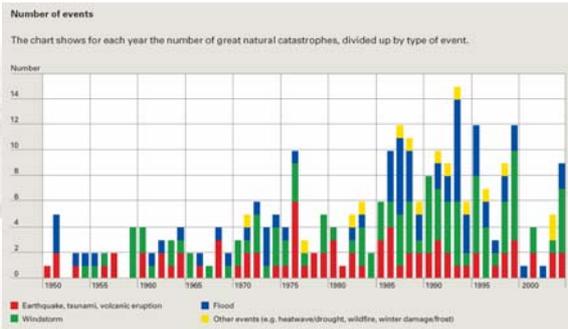
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Complete information about the Working Group 8.4 „Disaster Risk Management“

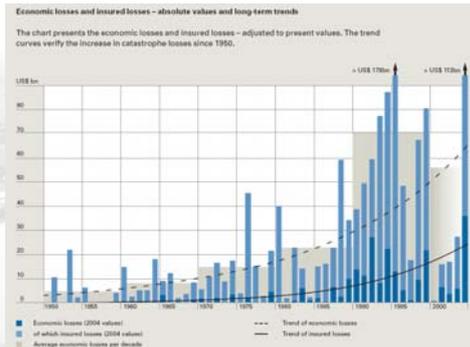
- In english and german language
- General Infos/Statistics about natural disasters
- Research
- Forthcoming Events
- Documents
- Glossary
- Links



Great natural catastrophes 1950-2004



Great natural catastrophes 1950-2004



The River Rhine at Cologne



View from Cathedral, Köln Germany, 15 July 2001

Views from the Land Consolidation Area



View from the North



View from the South

Views from the Land Consolidation Area



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200-year-Flood: Flood Risk Area



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First Flood Protection Strategy

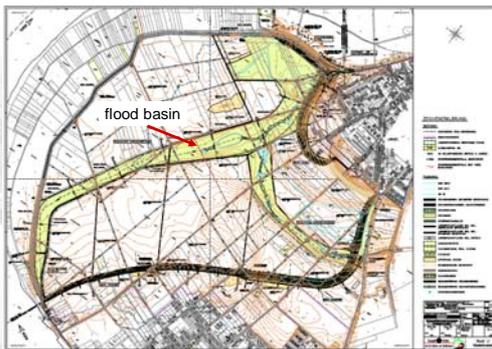


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Reshaping of the Land Consolidation Area

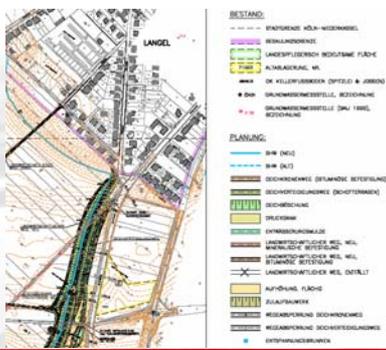


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