Flood Protection and Water Retention
A Mayor Challenge for Communities and the Rural Development Service in Germany

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German Federal Working Group Sustainable Land Development
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2003 – 2006 Member of the FIG Council

since 2008 Head of the Rural Development Service in Upper Palatinate (Bavaria/Germany)

(up to now)

since 2010 Commissioner for International Affairs of Bund-Länder-Arbeitsgemeinschaft ARGE LANDENTWICKLUNG

(up to now)

German Federal Working Group Sustainable Land Development
What could be done?
Outline

• General Framework and Starting Situation
• Integrated Rural Development „Krumbach-Project“ (Common Action Concept for Flood Protection and Water Course Development)
• Implementation by Means of Land Consolidation
• Outlook and Summary
Flood Protection and Water Retention: A Major Challenge

Some facts:

- **Krumbach (ravine)**
  - Watercourse length: 15 km
  - Drainage area: 36 km²

River system: Krumbach ➔ Vils ➔ Naab ➔ Donau
(Some) Typical Reasons of Floods

- **Climate Change**
  - increased number of heavy rains and thunder storms
  - heavy rains concern only small drainage areas

- **Anthropogenic (Man Made) Interventions**
  - straightening of watercourses
  - building areas extending to the banks
  - lack of natural flood areas
  - heavily cleared landscapes
  - agricultural land use which enhances the erosion and the drainage
Reasons of Floods: Anthropogenic Interventions
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Alliance of the four communities
- City Amberg
- City Hirschau
- Community Freudenberg
- Community Kümmersbruck

in the Integrative Rural Development „Krumbach-Project“

Symposium on Land Consolidation for Sustainable Development
Apeldoorn, The Netherlands, 9 to 11 November 2016

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Integrated Rural Development „Krumbach-Project“
(Common Action Concept for Flood Protection and Water Course Development)
Involved main project partners and their tasks:

- **Rural Development Authority**
  - initiating the alliance and the close cooperation
  - management of the planning process (citizen participation)
  - contracting authority for the common action concept
  - implementation of measures by means of land consolidation
  - support other developers by land management
  - public funding

- **Water Resource Management Authority**
  - consulting services

- **The Citizens and Landowners (Farmers)**
Integrated Rural Development „Krumbach-Project“
(Common Action Concept for Flood Protection and Water Course Development)

Planning Process

• a transparent planning process
• (workshop) moderation by the Rural Development Service
• discussion of the results in town meetings (consultation of all participants)
• in each municipality the Krumbach-Project is a matter of the boss
• close coordination with the Water Resource Management Authority
Integrated Rural Development „Krumbach-Project“
(Common Action Concept for Flood Protection and Water Course Development)

Objectives of the common action concept

- Flood protection of the settlement areas
- Enlarge the natural water retention areas
- Achieving a good environmental status of the brook Krumbach (European Water Framework Directive)
- Avoid soil erosion and nutrient input into the water bodies
- Improvement of the ecological structure in the whole area
Integrated Rural Development „Krumbach-Project“
(Common Action Concept for Flood Protection and Water Course Development)

Excerpt of the concept for the municipality Kümmersbruck
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Measures of the City Amberg
Raigering I: Rain Water Basin at the Brüllgraben
Measures of the City Amberg
Raigering II: Renaturation of the Brüllgraben
Measures of the City Amberg
Hiltersdorf I: Relocation of the playing field and ...
Measures of the City Amberg
Hiltersdorf I: Relocation of the playing field and renaturation of the Krumbach (creek)
Measures of the City Amberg
Hiltersdorf I: Relocation of the playing field and renaturation of the Krumbach (creek)
Land Consolidation Krumbach; Municipality Kümmersbruck

Goals of the Land Consolidation Procedure

- Implementation of the Common Action Concept for Flood Protection and Water Course Development
  - Activation of water retention areas
  - Construction of ground waves to slow down the water discharge
  - Renaturation of the brook
  - Ecological upgrading of the riparian strips
- Land management for the
  - Implementation of the action concept
  - Improvement of the agricultural structure
Land Consolidation Krumbach; Municipality Kümmersbruck

Land management and road construction to improve the agrarian structure

The ground waves remain in ownership of the participants (ban on the ploughing)

Allocation of land for the protecting strips: total 4,8 ha
Land Consolidation Krumbach; Municipality Kümmersbruck

Construction Projects

Modelling ground waves (inclination 1:10) for water retention
Retention volume: 180000m³

Renaturation of the protecting strips over a width of 30 m and a length of 1,6 km
Land Consolidation Krumbach; Municipality Kümmersbruck
Activation of water retention

Construction of

\(\textbf{\textit{üfour groundwaves with}}\)

\(\textbf{\textit{üfour flow rate reductions}}\)

for water retention.

The maximum retention volume is approximately 180,000 m\(^3\).
Land Consolidation Krumbach; Municipality Kümmersbruck

Water retention and flood protection

Start of construction in 2012
Land Consolidation Krumbach; Municipality Kümmersbruck
Water retention and flood protection

June 2013 – first practical test
20 years flood with water retention of 106,000 m³
Land Consolidation Krumbach; Municipality Kümmersbruck
Water retention and flood protection

Flood event in June 2013
Ground waves come into action – Retention areas are activated
Land Consolidation Krumbach; Municipality Kümmersbruck
Water retention and flood protection

Flow reduction in action – flow control during the flood
Land Consolidation Krumbach; Municipality Kümmersbruck
Water retention and flood protection

Three days later – flow control after the flood
Land Consolidation Krumbach; Water retention and flood protection

The ground waves and the flow reduction facilities are natural components of the landscape. The Krumbach meanders like 100 years before. The farmland is consolidated.
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**Land Consolidation Procedures to implement the common action concept for flood protection and water course development**

**Already in the planning phase (start 2014)**

- Municipality Freudenberg
  Land Consolidation and Village Renewal
  Greßmühle

**In preparation (start 2018)**

- Municipality Kümmersbruck
  Land Consolidation and Village Renewal
  Gärmersdorf-Moos
The Way to Success

Cooperation

Overall Concept

Land Management

Success

Endurance
Thank you very much for your attention!

References:

Rural Development Service Upper Palatinate
Community of Participants Krumbach
Community of Participants Steiningloh-Urspring
Community of Participants Greßmühle

• Landscape Architect Karl Spindler, Kastl
• Engineering Consultant A. Weiss, Neunburg v. W.
  • Water Management Office Weiden
• Bernd Georgi, Amberg (aerial photographs)
  • Landscape Architect Lösch, Amberg
  • Engineering Consultant Seuß, Amberg
• Engineering Consultant Uniwasser, Kaiserslautern