

The influence of linear structures in agricultural landscapes on flood and nature protection in consideration of agricultural interests in the Erzgebirge

S. Bianchin¹

Introduction:

The enormous quantities of water which caused the flood in Eastern Germany in August 2002 had their origin in the region of the Erzgebirge, a low mountain range in southeast of Germany. Based on the Project HochNatur, the aim of which is to develop measures that both prevent floods and support nature conservation, the intention of my research is the specific examination of linear structures in agricultural landscapes and their influence on biodiversity and runoff processes. A tight interdisciplinary cooperation between hydrological modelling, landscape ecology research and a close collaboration with farmers and agricultural institutions are the main focus of my research.

Hypothesis:

Linear structures change the appearance of the landscape and influence runoff processes. The introduction of linear structures in agricultural landscapes leads to an alteration in biodiversity and a modified water balance. Therefore linear structures present a chance for nature as well as flood protection. The appropriate establishment of linear structures does not lead to a loss in agricultural productivity but can reduce damages due to water or wind erosion and can increase the water availability during dry periods.



Methodology:

Field-based scientific analyses to assess and quantify the influence of linear structures on biodiversity and water balance will be conducted. The results will be integrated into hydrological and erosion models (expert system FLAB, the precipitation/runoff model WASIM-ETH and the erosion model E2D and E3D). In a further step the outcomes of the modelling and the conservation assessment will be included in the questionnaire of farmers to evaluate the economical consequences which are associated with the establishment of linear structures in agricultural landscapes.

field-based survey of linear structures and the ambient agricultural land

- vegetation relevées
- root enquiries
- ground survey (soil moisture)
- shower tests
- analysis of macro- and micro-structure of hedges
- studies of the distribution of linear structures at the landscape level



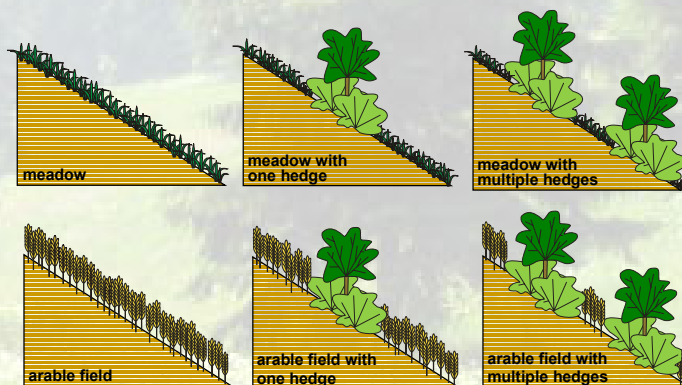
vegetation parameters

root parameters

soil parameters

modelling of the present state and various scenarios with

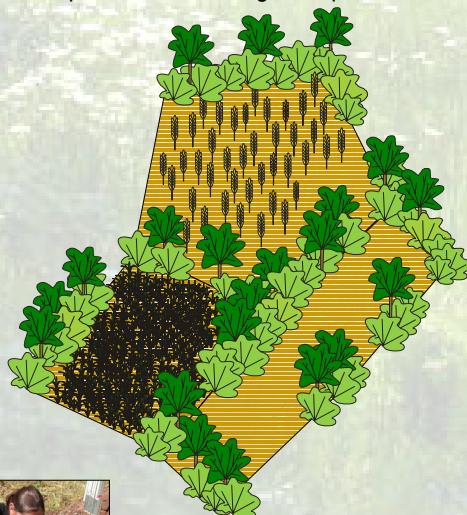
- expert system FLAB (areas of equal runoff)
- erosion model 2D and 3D
- precipitation/runoff model WASIM ETH



hydrological criteria

landscape and conservation assessment

- optimisation of linear structures for an increase in biodiversity (ecostone effect), connectivity and the possible presence of endangered species



nature conservation criteria

questioning of farmers about linear structures in agricultural landscapes in mountainous regions

- overall acceptance of linear structures on arable fields and meadows
- possible spacing, density and width of linear structures
- estimation of economical gain or loss due to linear structures
- valuation of financial incentives
- overall economical valuation

Fragebogen
Abschließende Befragung der Teilnehmer.
Die Darstellung der Ergebnisse dieser Befragung wird keine Rückschlüsse
ziehen auf die einzelnen Betriebe zulassen.

Allgemeine Angaben

1. In welcher Höhenlage liegt der Großteil Ihrer landwirtschaftlichen Flächen?
☐ Untere Lagen (200-400 m üNN)
☐ Mittlere Lagen (400-700 m üNN)
☐ Obere Lagen (700-900 m üNN)

2. Welche Rechtsform besitzt Ihr Betrieb zum Ziel (2005)?
☐ Juristische Personen
☐ Einzel
☐ e.G.
☐ GbR
☐ AG

Natürliche Personen
☐ Einzelunternehmer / Haupterwerb
☐ Einzelunternehmer / Nebenerwerb

3. Welche durchschnittliche Bodenart herrscht auf den Flächen Ihres Betriebes vor?
 durchschnittliche Bodenart: _____

4. Wieviel Hektar landwirtschaftlicher Nutzfläche werden zum Ziel (2005) durch Ihren Betrieb bewirtschaftet?
 _____ ha

5. Welche durchschnittliche Größe haben die von Ihnen bewirtschafteten Sockeln zum Ziel (2005)?
 _____ ha oder a

development of a catalogue of criteria

Outlook:

The result of this research will be the development of a catalogue of criteria, for example most effective plant combination, spacing, density, width and possible financial support of linear structures. This catalogue should promote the establishment of linear structures in agricultural landscapes in mountainous regions for an increase in flood and nature protection. Furthermore this catalogue could be the basis of an integrated support program for linear structures in Saxony.

¹ Interdisciplinary Ecological Center, AG Biology / Ecology
TU Bergakademie Freiberg, Leipziger Strasse 29,
09599 Freiberg, Germany, sylvi.bianchin@ioez.tu-freiberg.de

