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Thüringer Landesanstalt für Landwirtschaft

Short rotation coppice as riparian buffer strips

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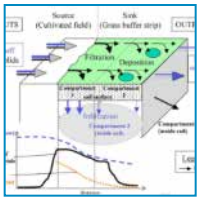
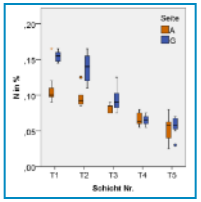
Structure



1) Background

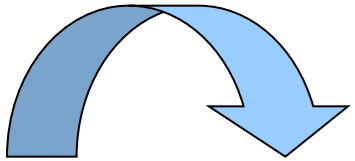
2) How to establish SRC buffer strips?



3) The project “SRC along water courses“

Soil Erosion

- Soil erosion is one of the major problems of modern agriculture



- Impact on the adjacent streams through polluted surface runoff and excessive sedimentation
  - à Interference of water flow
  - à Nutrient input à eutrophication
  - à Pesticide input à disruption of the ecological balance

Water Framework Directive

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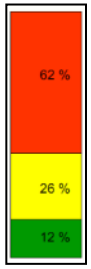
- Commits European Union member states to achieve good qualitative status of all waterbodies by 2015 (2027)

- Probability to achieve this objective in German rivers (Lübbe, BMELV 2010)
  - 62% achievement unlikely
  - 26% achievement unsure
  - 12% achievement likely



- Problems
  - Hydromorphological quality (river continuity)
  - Nutrient contamination (phosphorus)
  - Chemical contamination

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Riparian Zone

- Interface between land and a river or stream
- Decline and damage of natural riparian zones with expansion of agriculture

Functions of Riparian Zone

- Supply shelter and food for many aquatic animals
- Habitat for different animals and plants
- Connection between habitats
- **Natural biofilters protecting aquatic environments**

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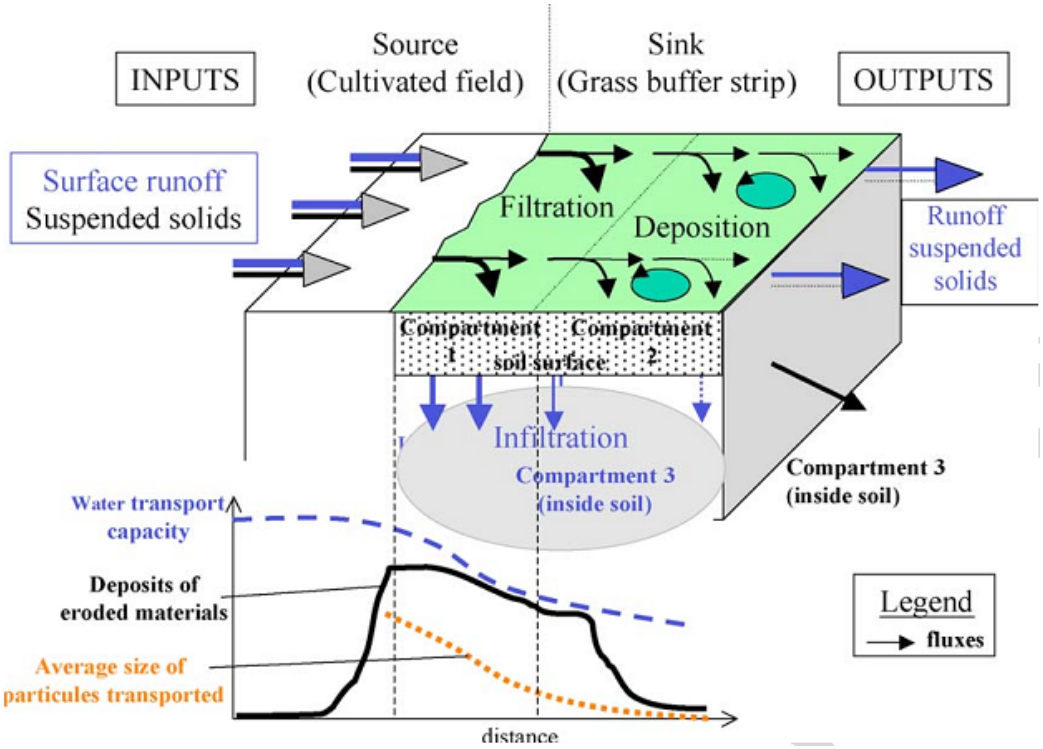
Effect of Buffer Strips

The buffer function of grass strips along water courses is scientifically proven by different studies (z. Bsp.: Schmitt 1999, Dorioz et al. 2006, GERASST 2009)



QUELLE: DORIOZ, J. M., WANG, D., POULENARD, J., TRÉVISAN, D. (2006): The effect of grass buffer strips on phosphorous dynamics – a critical o review and synthesis as a basis for application in agricultural landscapes in France. In: Agriculture, Ecosystems and Environment 117, S. 4-21.

Hypothesis

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SRC strips along watercourses are a sustainable management concept which perfectly combines agriculture, energy wood production and protection of water and soil

Management option for at least the next 40 years

Ecological function
Habitat for plants and animals
Connecting habitats
Reduction of CO_2


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Water protection
Permanent plant cover
Improvement of soil structure

Energy wood production

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Short Rotation Coppice - SRC

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Fast growing tree species

Ability to coppice

Production of woodchips

Planting of cuttings

Rotation period 4 to 8 year

Coppice

How to establish SRC buffer strips?

Management Strategy (Bärwolff 2012)

- Size of SRC buffer strips
  - Minimum width of 12 - 18 m
  - Minimum length of 250 m (0.3 ha minimum size to get subsidies)
- Rotation period 10 to 20 years
- 2000 – 3000 plants/ha (3 x 1.5 m)
- Tree species: willow or alder
- Motor-manual harvest
- Browsing protection necessary
- Lower income than from conventional SRC


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Federal Water Act

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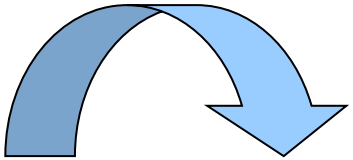
Federal Water Act § 38

- Riperian strip has a width of 5 m
- Site-specific tree species and shrubs can only be harvested as part of forest management (not agriculture management)



Harvesting of SRC is prohibited within a 5 m riparian zone

- The responsible authority can make exceptions

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Short rotation coppice along watercourses – the project

Study site in Northern Thuringia

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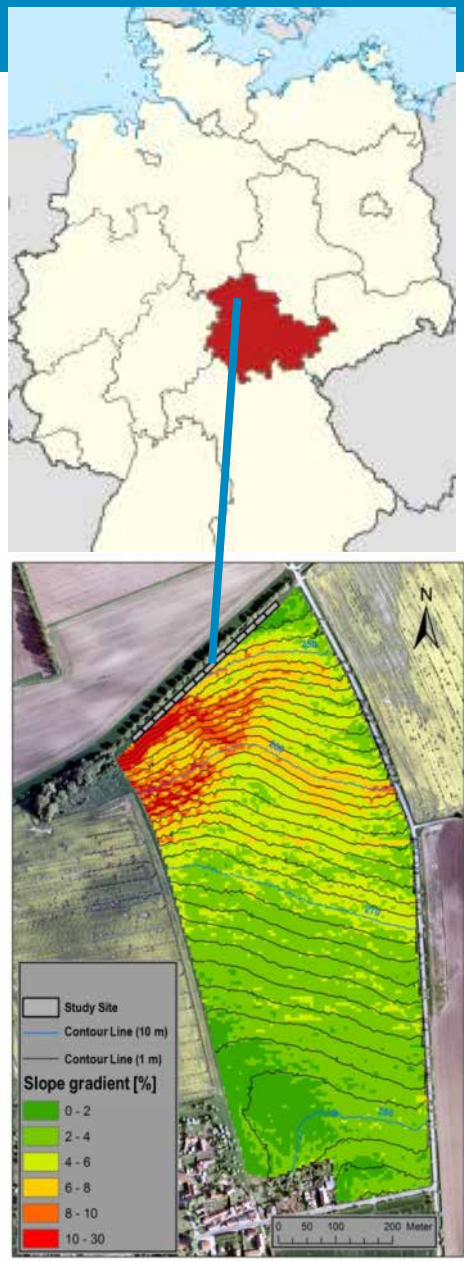
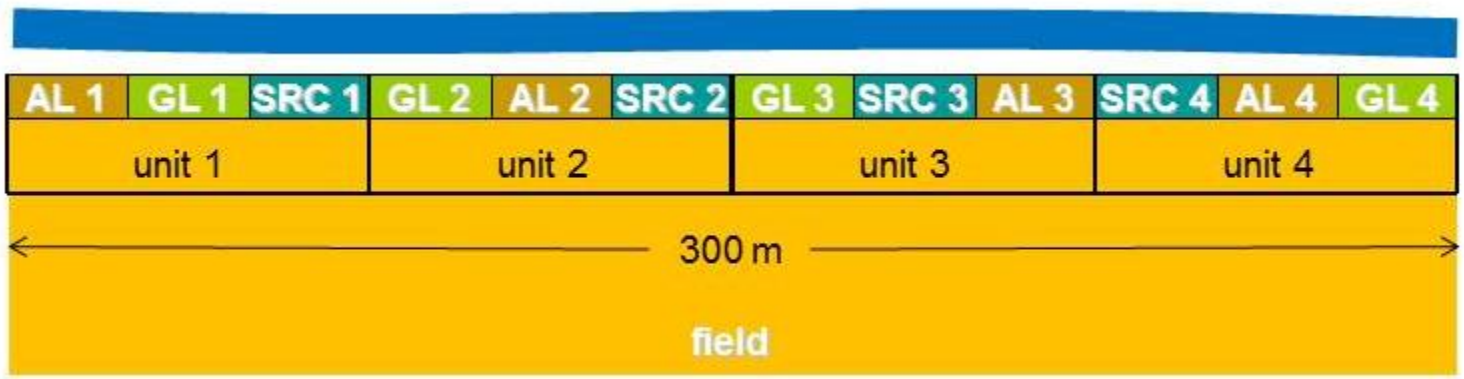
- Long-term mean values (Großenehrich 1961 – 1990)
  - Precipitation: 547 mm
  - Temperature: 8.2 °C
- Riperian strip was initially used as headland → heavily compacted soil
- Since 2006 used as grassland
- In Spring 2011 establishment of the study site
  - SRC (willow), grassland, arable land
- Scientific investigations/measurements since Spring 2012



Study design

- Treatments: arable land (AL), grassland (GL) and SRC (with willow hybrid Tordis)
- Four randomised repetitions
- Study objectives
  - Physical and **chemical (N and P) soil parameters**
  - Erosion: irrigation experiment and **modelling of potential soil loss**
  - Water quality and suspended particles in the Bennebach
  - Composition of plant species
  - Biomass production (tree growth)



Potential Erosions Exposure

- Average soil loss and gullies of the neighbouring field were simulated using the model AVErosion and ACCUM Plus
- Calculation of water induced soil erosion is based on the Universal Soil Loss Equation (USLE)
- Scenarios:

(a) current crop rotation (maize, wheat, rape, wheat, barley)

(b) fragmentation of the field with buffer stripes and current crop rotation

(c) adapted crop rotation (abandonment of maize)

Potential Annual Mean Soil Loss

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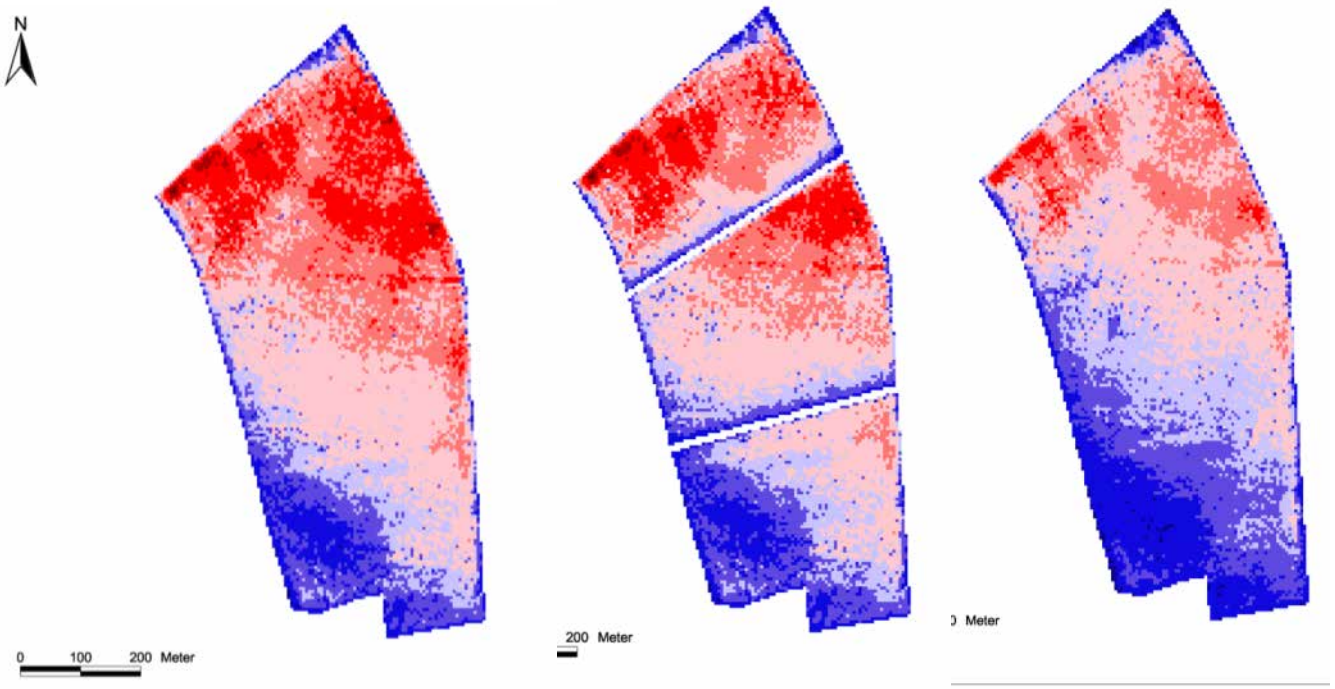
a) Current crop rotation: 5.96 $t*ha^{-1}*a^{-1}$ (a)
b) Implementing buffer stripes within the field: - 15 %
c) Abandonment of erosion prone cultures: 3.50 $t*ha^{-1}*a^{-1}$



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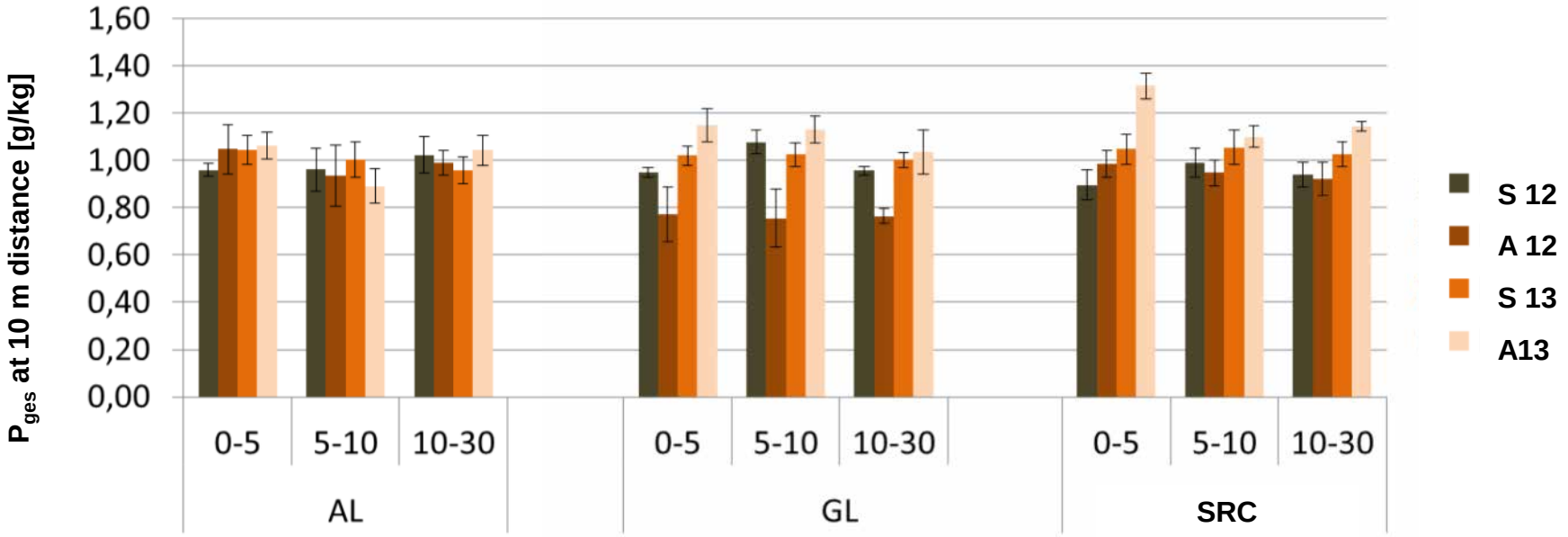
Soil analysis - phosphorous

- Soil sampling at 2 m and 10 m distance from the arable land above the study site
- Initially no significant differences on the site



Conclusion

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- First results of soil analysis indicate that SRC act as buffer and store phosphorus
- The retention capacity of SRC may exceed those of grasslands
- The implementation of SCR buffer strips along watercourses requires a higher acceptance of farmers
- Demo sites, public relation campaigns and subsidies are necessary to compensate the lower income and to value the ecological functions

Perspective / Research questions

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Initiation of the 2nd phase of the project planned for 2015 with 3 new partners

- Investigation of long term development of the retention capacity of SCR
- Effect of reconversion of SRC into arable land
- Landscape analysis - modelling retention capacity of SRC buffer strips in Thuringia and Saxonia
- Evaluation of further possible application of SRC for water protection
- Enhanced public relations

Thank you for your interest!

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LWA

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