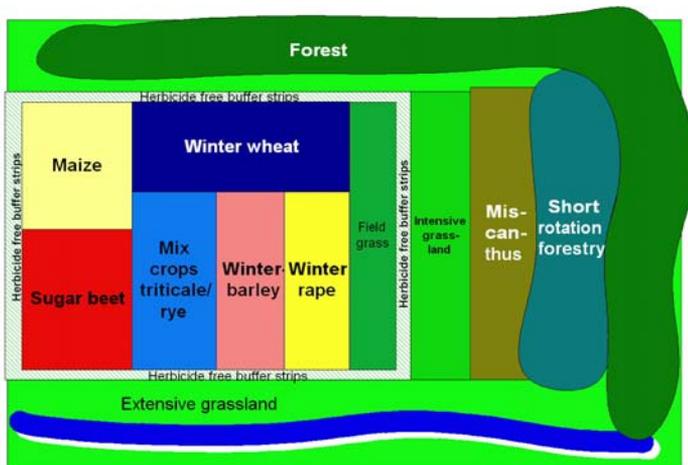




# Implementation of integrative energy crop cultivation concepts on biogas farms

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DEFINITION AND SCIENTIFIC APPROACH: Scientists working on concepts to combine the different utilization options of landscape to produce food, fodder and energy and support simultaneously habitats for wild life (Karpenstein-Machan, 1997, 2001, 2004, 2009a, Rode and Kanning 2010). Integrative cultivation concepts should harmonize utilization and protection of landscape. The vision of “integrative concepts” is to contribute to a more diverse agricultural landscape, keep nature in balance and conserve ecosystems. Furthermore integrative concepts support locally adapted energy crop cultivation and the transformation in energy in locally scaled energy plants.



Model of an integrated cultivation concept with food, feed and energy crops (modified from Karpenstein-Machan, 2004)



Mixture with Wintertriticale and Winter vetch (*Vicia sativa*)



Herbicide free flowering bands



Red fescue (*Festuca rubra*) undersown in maize



Double cropping: *Sorghum bicolor* follows Wintertriticale as second crop



Perennial crop Silphie (*Silphium perfoliatum L.*) grows in second year

ABSTRACT: Proposals for sustainable crop rotations were developed for three biogas farms, which produce market and energy crops under heterogeneous soil and climate conditions. Before reorganization the farms produced energy maize in monoculture on great parts of their fields. On parts of the farmland new crops and cultivation concepts, e.g. under sown seeds, crop mixtures, perennials and herbicide free buffer strips were tested. In the first step crop rotations were agronomically optimized to increase biodiversity, stabilize humus content, reduce pesticide input, nitrate leaching and stabilize biomass and crop yield against biotic and abiotic stress. On ecological sensitive soils perennial crops were tested. Optimization of the crop rotations leads to higher diversity, humus balanced crop rotations and increases the contribution margins of two farms slightly, in one farm the margins were reduced by 6%. As a second step energy farms can offer environmental records e.g. herbicide free buffer strips and flowering bands to improve habitat for many species of wildlife in the open farm lands by causing an edge effect.



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