

Potentials of marginal lands – sponateous ecosystem development

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Marginal lands are often considered as unfertile and not productive. They are widely excluded from modern land use by conventional agriculture. Assessment of soil fertility usually shows very low productivity potentials at least for growing traditional crops. However, it can be frequently observed that natural succession at different types of marginal lands leads to very diverse and nonetheless productive ecosystems. Examples can be found at abandoned former industrial or transportation sites which were set aside and not further maintained – and also in post-mining landscapes.

In one of the lignite open cast mines of the State of Brandenburg in Eastern Germany a landscape observatory was established in 2005 for observing this natural ecosystem development under marginal site conditions. The site of 6 ha is part of the post-mining landscapes of Lusatia which are often characterized by poor soil conditions and clearly reduced soil fertility. It is named “Hühnerwasser-Quellgebiet” (Chicken Creek Catchment) after a small stream that is restored again after destruction by the mining operations. It is planned to serve as the headwater of this stream and was left to an unrestricted primary succession. A comprehensive scientific monitoring program is carried out since the start of ecosystem development in 2005.

The results offer exemplary insights into the establishment of interaction networks between the developing ecosystem compartments. After 10 years a large biodiversity, expressed by a high number of species, can be found at this site as the result of natural recovery processes. A large number of both tree species and individuals have settled here. Even if no economic use of the site and of the woody biomass produced by these trees is planned, an overall assessment of the biomass production was carried out. The results showed that the biomass production from natural succession without any application of fertilizers etc. is directly comparable with yields from adjacent post-mining sites where trees are grown in agroforestry systems for bioenergy production. This reflects the general potentials of marginal lands with regard to biomass production.