Zuordnung zu Session 2: Biomassepotenziale - Nutzung degradierter Flächen

Is biomass production consistent with tree retardation of explosives on former military sites?

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Former ammunition sites are of special interest as potential biomass production sites because of the large extent of these areas (e.g. 2,8% of the entire area in Germany). In the state of Brandenburg with approx. 2 000 square kilometres even seven percent of the land‘s areas are former and currently used military areas. To a considerable extent the soils in these areas are suspected to be contaminated with explosive specific substances like TNT (2,4,6-trinitrotoluene) or RDX (Royal Demolition eXplosive). Soil leaching of explosives by precipitation is endangering ground water resources and residues of munitions are restricting the site usability. To a greater extent these military sites are covered with woodlands, mainly with conifer stands.

Resource utilisation concepts for explosive contaminated areas regarding biomass production have to maintain the pollutant retardation and natural attenuation potential of the vegetation. Soil cultivation should be held on a minimum level because it dramatically enhances remobilisation of soil explosives. Therefore, „agro-forestry“ is not recommended here.

Pines and spruces, respectively do not only accumulate TNT in their roots. Moreover, these trees TNT readily transform TNT. At least 90% of transformed TNT derivatives are long-lasting metabolically bound in cell wall components like lignin and hemicelluloses. Field grown energy plants and fast-growing agro-forestry trees, like willow and poplar are less tolerant to degraded military soils and to soil explosive contaminations as well than coniferous trees. Therefore short rotation crops are inefficiently for biomass production on degraded areas.

Underneath conifer forests percolation is substantially lower than beneath deciduous forests, or agronomic crops or grassland. Caused by winter transpiration and crown interception, thus, indirect retardation of soil pollutants is the highest beneath conifer stands.

Indirect pollutant retardation and accumulation of detoxified explosives in trees considerably contribute to soil and ground water protection goals. Biomass production is conflicting with biodiversity loss due to the decline of open landscapes.

The knowledge basis for a holistic contemplation of the long-term fate of explosive compounds in trees is considered as insufficient to deliver resilient information for the forester.

Trees themselves can apparently mineralise explosives only to a low extent in a direct manner. First results for possibilities of an indirect mineralisation of explosives during rot processes of dead conifer residues (e.g. roots or needles) are waiting to be balanced in a long-term scale. For leaf-bearing main forest trees (e.g. beech, oak, maple) any information regarding uptake and transformation of explosives is still lacking.