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Optimization of the drain-Regulation in hinterlands of low Mountain ranges under the aspect of natural flood retention

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Problematic nature and objective target

By the increasing settlement pressure or pressure of utilisation on flood-threatened surfaces and by changes of the climatic circumstances an accumulation of flood events is to be expected. That's why applicable strategies are required in practice to tone down such events or to prevent them.

The destination of the project is the production of a standardised watershed developing concept (EEK) which can be offered as a technical service to the improvement of the preventive flood control by optimization of the land use and vegetation.

Innovations are enclosed:

1. First-time development of hydrologic characteristics (Abflussbeiwerte (run-off co-efficient), Oberflächenrauigkeit (finish roughness)) for biotope types of German low mountain ranges with the help of standardised soil/utilisation/vegetation units

2. First-time consideration of paths of drain concentration

3. Innovative parametre inquiry from existing sources of information

Principles

According to present state of the flood models land use changes have no influence

for the **slow great flood events** in widespread watersheds. Here the factor wide precipitation and/or melting of snow dominates all remaining factors. On the contrary **small quick floods** in small watersheds are influenceable by land use or management changes, even in different measure according to characteristic features of the respective watershed.

So the attention of the present project is aimed on this small quick floods. However, also differentiated informations for the solution of flood problems in big watersheds can be reached by the summation of statements about small watersheds.

High water points of extreme flood events can be toned down if the run-off is buffered in the upper reaches of the river systems, so, above all, in the area of the low mountain ranges. For the buffering of the surface run-off the soil, the vegetation and land use and the forms of water drain system are determining. The consideration of the last-called problems remains ignored here. Moreover there are already extensive investigations about this subject

The development of a standardised planning procedure (incl. GIS implementing) for the optimization of the drain regularisation serves for the reduction of the flood danger. Land use and vegetation is so optimized in adaptation to soil and land management and by taking into account prevailing drain roads that an essential contribution to the regularisation of the surface run-off is performed.

Working draught

The aimed procedure has to use above all the combination of parametres simply to be grasped (e.g., from atlases, available data supplies of the responsible authorities, or from easy field or GIS methods) which are set up by scientific investigations and are valued as relevant to allow a quick and Germany-wide application.

The run-off of rainwater from land surfaces are characterized by the Abflussbeiwert (run-off coefficient) and the Oberflächenrauigkeit (roughness as a sign for the assembly-line speed in the surface). The **Abflussbeiwert** is derived from the basic information as vegetation unities, soil propertyies and types of land use and is divided in classes.

The evaluation of the **Rauhigkeit** takes place after basic vegetation formations (e.g., lawn locations, humid locations, forest locations) or surface types of the soils with lacking vegetation (public thoroughfares, initial soils). By variation of Abflussbeiwert and Rauhigkeit about vegetation and land use proposals are designed for a buffering of the rainwater run-off.

As a **model object** two watershed areas are envisaged (e.g., in the Thuringian Schiefer-

gebirge and Frankenwald) in which concerning land use and vegetation representative relations exist. The results should be applicable all over the country in low mountain ranges.