

# INTEGRAL PLANNING OF REFORESTATIONS TO REDUCE PEAK FLOWS IN THE BAVARIAN RURAL COMMUNITY OF GELTENDORF, GERMANY

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Extreme precipitation can cause flash floods with high destructive power. In 1999 and 2000 flood events happened in the area of the community of Geltendorf and caused damage in agricultural land. To prevent flood damages in this region in the future, an engineering company had planned the construction of a flood control-reservoir. The conversion of agricultural land into forest was not integrated in the concept, although some scientists wrote about the benefit of forest to reduce peak flows especially in small watersheds. In order to gather additional factual evidence on the effectiveness of forests for flood control an investigation was carried out to answer the questions:

1. How can integral planning of reforestations be arranged?
2. Which contribution can reforestations make to reduce the risk of flood in small watersheds?

To question 1:

As a result of the investigation for integral planning is to establish a Round Table with participants of the technical authorities and stakeholders among others from the nature conservation, agricultural organisations and landowner. Cooperation of technical authorities is well established. It is already fixed in guidelines and laws. As a rule, the cooperation is carried out by written comments. Meetings at the Round Table are rather exceptions. The investigation shows that there were no difficulties to establish the Round Table with all who demonstrate an interest for planning reforestations in this area.

The advantages of an integral planning at Round Table were found to be short ways of information and possible acceleration of the administrative procedure. However in practice it is not often used. Probably it is difficult to find volunteers, who arrange and coordinate the Round Table, because of lot of preparative work at the beginning. A spokesman must be identified. An appropriate spokesman could be the mayor for following reasons. He is familiar with local terms, knows the technical authorities and is able to involve the public in the right moment. The additional efforts of coordination could be balanced by speeding up the administrative procedure. The Round Table creates transparency and increases agreement for the intended measures.

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To question 2:

This issue was tested by the application of the watershed model ArcEGMO-PSCN, which enables the modelling of different forest cover scenarios and calculates the change of the discharge. The simulated forest cover percentage ranged from 31,2 % up to 99,8 %. The model reproduces the interchanges between vegetation (forest, grassland etc), water balance and balance of matter. Among other things the input parameters are precipitation, temperature, land use, soil map, and topography. The model is validated by comparing simulated and observed values.

Depending on the local conditions and for a period of twenty years, in brief the results are as follows:

- reforestations make a contribution to the preventive flood protection. They are an important element to store precipitation in the area.
- with an increasing forest cover percentage flood peaks decrease and low water run-off increase, forests reduce the risk of flood and reduce the desiccation of soil.
- reforestation area of about 450 ha in the Geltendorf area, that means in this case a forest cover of 43 % reduces flood peaks by 8 % in average.

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