Sediment remediation pays off: Socio-economic analysis and cost disproportionality of measures using the example of the Elbe river basin

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Introduction: A shortcoming in the implementation of the Water Framework Directive (WFD) in the international river basin of the Elbe is that a river basin-wide analysis of the most cost-effective pollutant remediation measures to improve sediment status has not yet been carried out, resulting in a lack of measures for reasons of cost disproportionality. This inevitably leads to the problem being merely shifted within the river basin, as can be seen, in the persistently high pollutant loads in the sediments of the Elbe catchment area and their transport to the North Sea. Here, as in many river basins across Europe, deficits in sediment quality are significant obstacles to achieving the goals of the WFD and the Marine Strategy Framework Directive (MSFD). Better sediment quality is therefore an important step towards good ecological and chemical water status or good status of the marine environment [1].

As a result, integrated sediment management concepts were developed some ten years ago [2], which identify coherent measures to achieve supra-regional management objectives. However, to date, not a single effective sediment remediation measure has been implemented through the WFD programme of measures.

In particular, the consideration of economic effects in the selection of cost-effective measures and the determination of the cost disproportionality of measures still cause problems in Europe. Up to now, there has been a lack of application of suitable methods and thus also of experience with their use. In Germany, a river basin-wide coordination of measures and exceptions is particularly complex due to the federal structures.

According to the current legal situation in Germany, the federal states can decide which measures they want to implement in order to comply with the WFD. This leads to a prioritisation of locally effective measures in particular. The costs incurred are directly offset by a corresponding local benefit. On the other hand, remediation measures that would only have a positive effect in downstream water bodies and the sea are classified as "disproportionate costs" by the responsible federal states. The situation is similar in international river basins, where downstream riparians depend on measures being implemented upstream to remediate pressures at source.

Methods: But how would the proportionality test turn out if the local costs were compared with the benefits in the entire river basin, as is actually intended by the EU in the sense of integrated river basin management according to the WFD? Our study clearly shows that remediation is worthwhile, here and now, in order to achieve a good condition of the waters and the marine environment. A toxic-free environment by 2050, as envisaged in the EU Commission's ambitious zero pollution strategy, cannot be achieved in the Elbe river basin without remediation of sediments - probably not in other river basins either. Looking to the future, the investments are even more worthwhile - we will need clean sediments to protect the coasts from sea level rise.

But how do you solve the problem that, according to the current legal situation, the regularly high costs of remediation measures have to be paid by just one party, even though everyone benefits? The answer: share the burden. In a first step, through a solidarity fund in the river basin community, in which a supra-regional, internalised financial compensation is created that also reflects the benefits for the individual federal states. In a second step, a financing concept should be sought that also takes into account the 'polluter pays' principle [3]. Such funds are currently very popular, for example to finance the elimination of trace substances in wastewater treatment [4] or special European funds to cover the costs of pollution from the main pollutants and polluting sectors.

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