

Short Project Summary

Identification of erosion hot spot and leverage areas

Eva Paton¹, Anna Smetanova¹

¹TU Berlin

Land degradation and water availability in semi-arid regions are interdependent challenges for management that are influenced by climatic and anthropogenic changes. Erosion and high sediment loads in rivers result in reservoir siltation and decrease storage capacity, which pose risk on water security for citizens, agriculture, and industry. In regions where resources for management are limited, identifying spatial-temporal variability of sediment sources is crucial to decrease siltation. Despite widespread availability of rigorous methods, approaches simplifying spatial and temporal variability of erosion are often inappropriately applied to very data sparse semi-arid regions.

Methods and Data

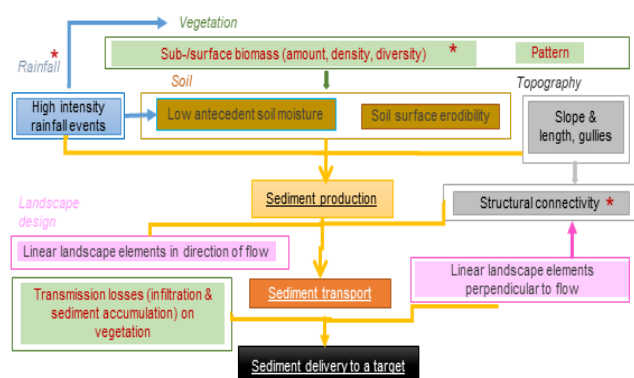


Figure 1: Mesoscale mapping of sediment source hotspots

In this work, we developed a spatial-temporal mapping approach for the identification of erosion hotspots and leverage areas in all case study regions using a minimum data inventory with data globally available with temporal changing vegetation and rainfall and connectivity calculation (Figure 1).

Results and Conclusions

In combination with a seasonal forecast, it becomes now possible to identify leverage areas, where management of erosion hotspots would have the greatest impact in reducing erosion and sediment delivery into downstream water bodies, four to six months in advance. Early adaptation of the land-use in a fraction of the catchment area (Figure 2) will result in a significant reduction of erosion load and downstream reservoir siltation. The combined use of the mesoscale erosion hotspot tool and the seasonal forecast illustrate how, where and why land-use manager have to work in concert with water management authorities to avoid upstream erosion and minimize siltation.

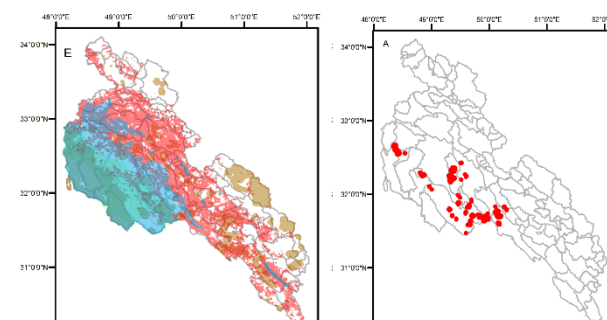


Figure 2: Erosion hot spots and resulting leverage areas for the Karun catchment at the beginning of the rainy season

References

Smetanova, A., A. Müller, M. Zargar, M. A. Suleiman, F. R. Gholami, M. Mousavi (2020) Mesoscale Mapping of Sediment Source Hotspots. Water 12: 2 doi 10.3390/w12020396