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Framework for integrating sediment sources information with paying for environmental services to soil and energy security in Kulekhani catchment, Nepal

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Kulekhani hydroelectric reservoir (KHR) is the most important source of water which used to generate 20 % of total electricity used in Nepal. Water-induced erosion in a catchment due to its erosion prone area coupled with land use change and agricultural activities is contributing substantial sediment load into the KHR, thereby threatening sustainability of hydropower production. Nevertheless, KHR management authority has been providing incentives to local communities to mitigate soil erosion in the catchment. This sort of payment for environmental services (PES) schemes may have been inappropriate framework due to lack of accurate information about sediment source contributions to KHR from the catchment. Recently compound-specific stable isotope (CSSI) sediment fingerprinting has been applied in the catchment which seems very promising in terms of providing accurate information on the effectiveness of soil conservation practices through apportioning the land use-specific sources of suspended and deposited sediments. This valuable information can be used by different stakeholders to allocate the resources for appropriate land management decisions.