



Interactions between soil conservation service and land cover changes in the Three Gorges Reservoir Area after returning farmland to forest

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Intensification of returning farmland to forest has led to success in ecological construction and improvement. Returning farmland to forest project has been implemented at the Three Gorges Reservoir Area (TGRA) since 2000. We aimed to access the soil conservation service variation in the Lanlingxi watershed of TGRA using land cover change as a proxy indicator. Lanlingxi watershed is a representative pilot of TGRA, which included specialized in the national demonstration of returning farmland to forest project. The multi-stage methodology included; (i) land cover analysis in phased process using and GIS (ii) assessing soil conservation service values using InVEST model. The results showed that during 1999-2017, significant land cover transformations occurred in the study area, increase of economic forests land, tea, citrus in exchange of cultivated land. Lanlingxi watershed covered an area of 1527.43 hm², cultivated land occupied 32.58% of the 497.65 hm² in 1999, and reduced to 4.16% in 2017. Tea land occupied 19.41% of the total land in 2017, which was under 1% in 1999. Land cover conversion was from cultivated land to tea, citrus and bush. Land cover change happened within at lower altitude of protection and economic forest, no significant change at ecological welfare forest. The value of soil conservation was 415.08 t/hm² in 1999, while the land was cover by tea, citrus and bush in 2017, the value of soil conservation was higher than 490 t/hm². Total soil conservation increased 28.56% at lowest attitude and 19.82% at intermediate altitude area in 2017 as a result of land cover change. The ability and capacity of soil conservation were higher by returning farmland to forest. Such changes contributed to the increase of soil conservation service, mainly as a result of a better capacity in soil and water conservation by forests. The results of this study emphasized the importance of land management and forests restored for better ecosystem services and conservation.