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## Efficiency of BMPs for the reduction of sediment loads in the control of nutrients.

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Inappropriate tillages and the intensive use of mineral fertilizers are fundamental driver of soil erosion and land diffuse pollution. The new European environmental policies, such as the European Green Deal (EUGD) and the Farm to fork strategy aims to restore the natural functions of ground and surface soil by 2030. Best Management Practices (BMPs) are mitigation measures which will be included in EU Member States management programs to achieve the policies goals. Most of BMPs have as their first function to reduce soil erosion, however these can have effect also on the nutrient loads. This work assessed the power of soil erosion oriented BMPs in achieving nutrient load reduction by means of the Soil and Water Assessment Tool (SWAT) in the Carapelle basin (Apulia, Italy). Moreover, their economic convenience was evaluated for both the public and the private sector. Five alternative scenarios were implemented: Contour farming (CF), no tillage (NT), reforestation (RF), and two additional scenarios, including the 20% reduction of fertilizers in CF and NT, (CFR) and (NTR), following the EUGD strategy. With the current management of the areas total nitrogen (TN) was  $\sim 49 \text{ kg ha}^{-1}\text{y}^{-1}$ , while total phosphorous (TP) was  $\sim 0.044 \text{ kg ha}^{-1}\text{y}^{-1}$ . N-NO<sub>3</sub> load increased for NT and CT in terms of surface runoff and leaching. Contrariwise RF, as well as CFR and NTR scenarios showed a reduction of N-NO<sub>3</sub> losses. In particular CFR and NTR abated of  $\sim 20\%$  surface runoff and leached N-NO<sub>3</sub> load. Economically, RF was profitable in sloped areas while CFR and NTR were the best alternative in those hilly and flat. This suggested that RF may be implemented in combination with other practices to have a greater impact at the basin scale. BMP implementation requires significant investments (public and private). The results of this study provide the scientific basis for decision-making for agriculture and watershed management.