
Soil carbon losses by deforestation in the tropics

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Importance of soil carbon

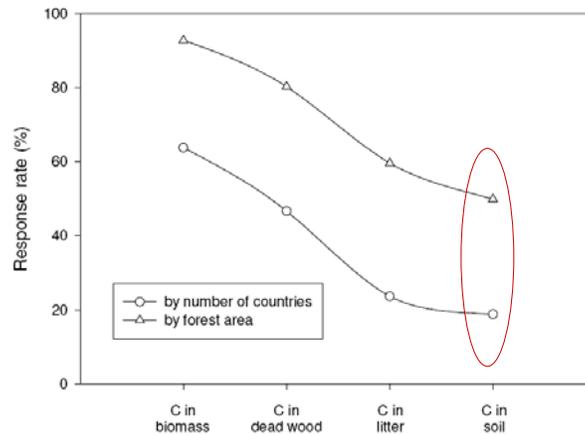


- **Soil fertility**
- **Water retention**
- **Protection against erosion**
- **Resilience to disturbance**



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FAO: data availability



Marklund & Schöne, FAO 2006

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A rough estimate of soil C losses

- Standard soil depth 30 cm
= 2/3 of total soil C stocks
- Soil C stocks: 45 % (25-60 %) of forest C stocks
- C losses by deforestation

	average tC/ha
– 100% aboveground biomass	56
– 50%? belowground biomass	7
– 100% dead wood & litter	16
– 40% soil C	29
SUM	108
- Soil C losses account for >25-30% of forest C loss

Marklund & Schöne, FAO 2006

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40% of soil C lost: a conservative estimate

>40 reviewed scientific papers in last 2 years:

- **Deforestation effects:**
 - SOC not altered: 2 studies in Brazil: when native soil C stocks were low
 - SOC decrease or neutral: all other studies
average loss: 40-76% of original soil C stocks
- **40% decrease of soil C by deforestation is lower range of recent literature**



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Improving the knowledge basis: Cooperation with Papua New Guinea

- Cooperation with the Papua New Guinea Forest Research Institute
- Capacity building in advanced soil sampling skills
- Joint development of representative soil carbon sampling scheme to be applied to their permanent forest monitoring plots
- Mutual laboratory visits



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Conclusions

- Soils hold at least 45% of the C in ecosystems
- Soil C losses account for >25-30% of forest C loss
- Soil monitoring is necessary and feasible
– e.g. Papua New Guinea



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