

From monoculture to agroforestry – The potential to increase the productivity of cattle grazing while improving environmental sustainability through silvopastoral systems

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Abstract

From an environmental perspective, the Earth is currently facing a number of crises that are jeopardising the long-term habitability of the planet. Two of the main contributing causes are firstly the degradation of landscapes accompanied by the loss of ecosystem services and secondly the emissions of greenhouse gases (GHG) that are causing irreversible climate change. When looking at the root causes of these problems one soon identifies the livestock industry as a key contributor, in particular the cattle industry due to its unparalleled resource inefficiency and dominating role in causing land degradation, water pollution, GHG emissions and biodiversity loss. The 2018 IPCC report called for an unprecedented economic shift, which is necessary in order to reverse the trajectory of degradation and instead shift industries towards regenerative practices that restore the ecosystem services which all aspects of human life on Earth, including our economy, depend on. Regionally, the thesis focuses on Latin America, where cattle grazing is still the main economic practice in many low-income rural areas. Although the region produces more beef than any other region, productivity is declining due to the ongoing land degradation. The implementation of regenerative silvopastoral systems (SPS) into the widespread small-scale cattle grazing systems provides an example of how the mentioned theoretical shift can be put into practice; so far, however, these systems have received insufficient funding. Data obtained through the Case Study carried out in Las Toronjas (Mexico), where small-scale farmers collectively integrated SPS into their previously treeless pastures, showcases the possibility to significantly increase the productivity of cattle grazing (on average by 46.25% during the rain season) while increasing environmental sustainability through improved soil quality and increased biodiversity presence. Additionally, the short timeframe (under four years) of the study combined with the low materialistic input costs (around \$780 per farmer) demonstrate that SPS can improve the economic and environmental sustainability of cattle grazing quickly and with low risk. This leads to the conclusion that such agroforestry systems should be incentivized further in

order to be scaled up accordingly throughout Latin America and in the tropics in general.

FIG. 2. *Rethinking sustainability; we need a shift from a linear understanding of finance and business activity to one that is holistic, systemic and cyclical.*

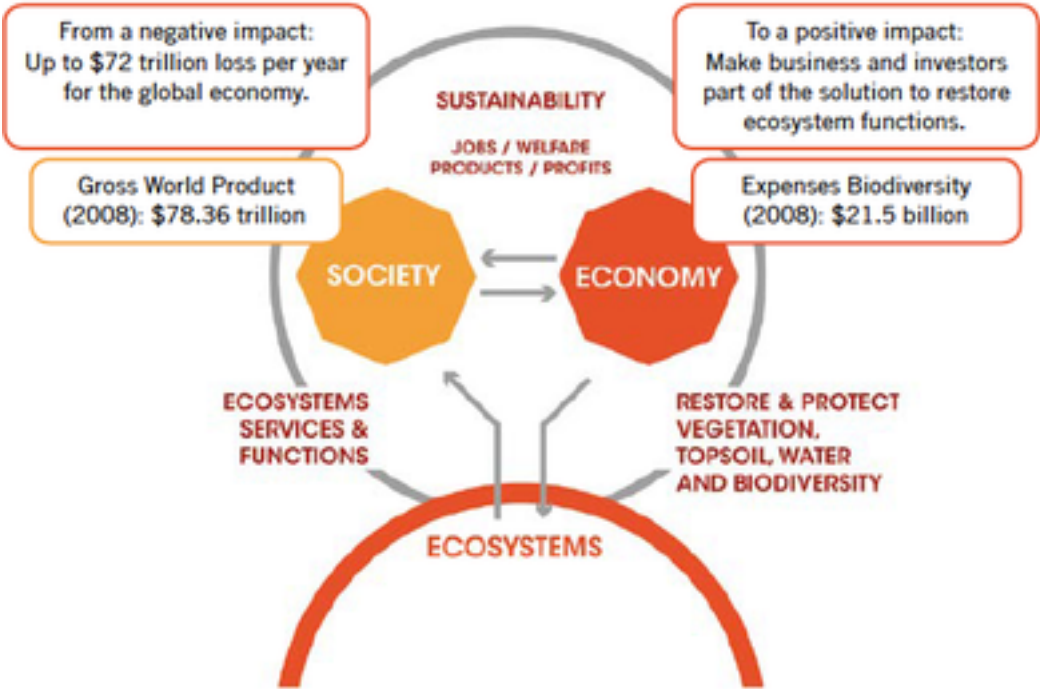


Chart: Willem Ferwerda