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Trade-Offs Between Biodiversity Protection and Poverty Alleviation Using Payment for Ecosystem Services at the Pasture-Forest Frontier in South Ecuador

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Abstract

Ecuador is very rich in biodiversity but has the highest annual deforestation rate in South America with much land being converted to pastures. The presentation investigates the effects of contrasting instrument options including Payments for Ecosystem Services (PES) that all foster a forest conversion ban in mountainous southern Ecuador. Biodiversity effects are expressed as cost-efficiency of conservation, and poverty alleviation effects as improvements of the GINI coefficient of farm household incomes. The tested conservation instruments differ with respect to being either mandatory or voluntary, and if all farmers are compensated by the same 'flat' payment rate per hectare or if the compensation equals individual opportunity costs calculated from survey data. Additionally, dedicated 'pro-poor' PES were investigated restricting payments to the poorest households. Empirical opportunity cost data stem from a sample of 130 local farming households living at the northern edge of the UNESCO Biosphere Reserve "Podocarpus-El Cónдор" in southern Ecuador. In all cases, a fixed budget of 25,000 USD yr⁻¹ is distributed. The amount equals the typical annual per ha payments of the Ecuadorian national Socio Bosque programme times forest area of the 130 households. The average opportunity costs is 156 USD ha⁻¹ yr⁻¹. A voluntary PES paying just farmer's opportunity costs can cover 305 ha (36 % of total forest area of the farms); the GINI coefficient does not change. A mandatory approach covering all farms in proportion to forest size and paying a flat 156 USD ha⁻¹ yr⁻¹ compensation only secures 136 ha. With most payments dispensed to the relatively least poor farmers, the GINI coefficient rises slightly to 0.488. Voluntary approaches with 156 USD ha⁻¹ yr⁻¹ improve the GINI coefficient to 0.477. If payments are restricted to the 60 % poorest farmers at flat compensation rates between 150 and 300 USD ha⁻¹ yr⁻¹, only 168 to 84 ha forest are covered but the GINI coefficient improves to 0.470–0.462. While mandatory approaches always perform worst, we conclude that severe trade-offs between cost efficiency and poverty alleviation are likely to impact PES application in the study area - and in other regions characterised by a majority of intensively used smallholder farms.

Keywords: Biodiversity conservation, economic incentives, environmental justice