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## Managing forest succession for biodiversity recovery: balancing ecological and economic needs

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With more than half of Earth's primary tropical forest gone and no signs that rates of forest loss will decline over the next few decades, survival of tropical biodiversity will depend increasingly on innovative technologies and novel socio-economic mechanisms to restore forests where they have been destroyed. At the same time, as human populations and affluence in developing tropical countries grow, compromises must be made between the ecological necessities for effective biodiversity restoration and the realities of meeting the economic needs of local people.

This paper reviews the range of current restoration options in landscapes subjected to various levels of degradation. It stresses the need to select appropriate techniques according to critical points in the ecological succession sequence including i) the point at which reduced tree seed sources and/or seed-dispersing animals become limiting; ii) the point at which cover of shrubs and herbs exceeds that of trees and iii) the point at which soil degradation becomes limiting. The roles of accelerated (or assisted) natural regeneration (ANR), the framework species method and the maximum diversity methods of forest restoration and use of nurse crops (foster ecosystems) in addressing these constraints are discussed.

Even forms of forestry, primarily designed to yield economic benefits, can be modified to stimulate biodiversity recovery. Traditional single species plantations can be sensitively managed to encourage natural regeneration of many indigenous forest tree species, provided weeding, thinning and harvesting are carried out with minimum damage to the understorey. Mixed species plantations and agro-forestry systems provide greater structural diversity for colonization by wildlife, whereas analogue forestry attempts to closely mimic the tropical forest structure using economic species.

Although some trade-off between biodiversity and economic yield is inevitable, restoration forestry can be modified to increase economic yield (and make it more attractive to local people) and economic forestry can be managed more sensitively to increase biodiversity recovery.