



PAYMENTS FOR BUNDLED SERVICES

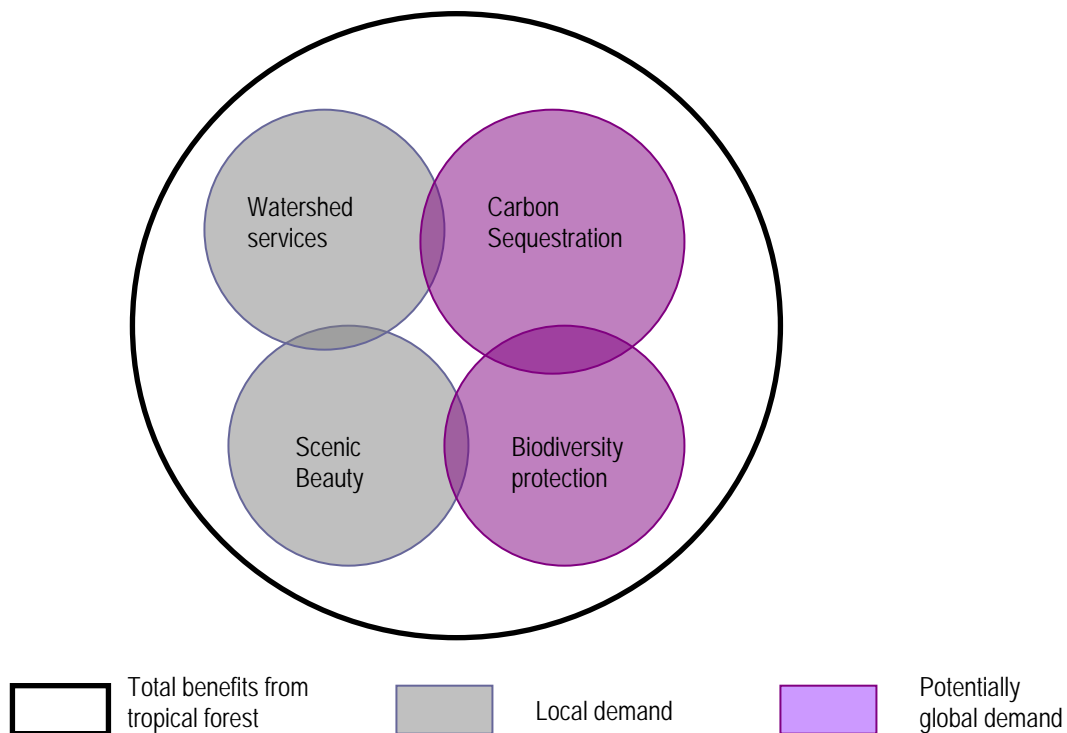
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Need for bundling services

Any ecosystem provides several kinds of environmental services at the same time. As we know, a tropical forest sequesters carbon, provides watershed services, is aesthetically beautiful, and conserves biodiversity (see the figure below). Selling only a few environmental services may not cover the



Environmental services from a tropical forest and sources of demand²

Adapted from: Pagiola, S., J. Bishop, and N. Landell-Mills (eds.). 2002. *Selling Forest Environmental Services: Market-based Mechanisms for Conservation and Development*. Earthscan, London.

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² Demand for scenic beauty can actually extend from local to global level.

opportunity cost of conserving the entire ecosystem. Instead, conservationists may need to organize payments for as many environmental services as possible. However, this will increase the transaction costs associated with selling each service individually. The solution may lie in bundling these services and selling them as a single product. For example, in Costa Rica's PSA Program, the National Forestry Fund (FONAFIFO) buys various environmental services as a bundle from local farmers and landowners. This saves the cost of contracting for each separately while helping to conserve the entire landscape. There are two issues to consider: whether the different environmental services are complementary, and the geographical extent of the demand for a particular service.

Complementary services

Often, environmental services provided by an ecosystem are complementary. For example, when trees sequester carbon, they also regulate water flow and maintain soil fertility, as shown by overlapping circles in the figure. Local conservation practices thus will produce multiple environmental services. This means that, by paying for a particular environmental service, users can also ensure the availability of other interrelated services. The U.S. Department of Agriculture operates the Conservation Reserve Program (CRP) under which agricultural producers and landowners receive annual payments to retire from production environmentally sensitive cropland and pastures that are susceptible to soil erosion. By making these payments to plant grasses, trees, and other cover crops that can reduce soil erosion and water pollution, the CRP has been able to generate several kinds of environmental services, including reduction in non-point source pollution, protection of wetlands, wildlife conservation, and carbon sequestration.

Not all environmental services are complementary. In fact, increasing the yield of a particular environmental service can have an adverse effect on the availability of another. If only one of these services is salable, payments can distort the supply of the other. In Tanzania, on receiving carbon sequestration payments, upland farmers opted for fast-growing monocultures such as eucalyptus, which disrupted the local water regime³. This is a potentially common scenario. "Natural" forests usually provide a good balance of the carbon, biodiversity, and watershed services, but carbon plantations maximize one at the expense of others. Better-balanced and bundled services may also mitigate the special risks of impermanence that are unique to carbon. The Regional Integrated Ecosystem Management Project in Nicaragua, supported by the Global Environment Facility, avoids this distortion by making payments based on an Environment Services Index (ESI) that combines biodiversity conservation with carbon sequestration services. At the time of enrollment, a baseline score is calculated for each farm, and farmers receive a one-time payment of \$10 per point. Thereafter, the project pays \$75 annually for each incremental ESI point. Farmers thus have an incentive to maximize their overall ESI score rather than produce any single environmental service⁴.

Local or global?

One major constraint in selling environmental services as a bundle is that some services have a local demand, while others have a potentially global demand. As the figure shows, soil fertility, watershed services, and erosion control have localized users. On the other hand, carbon sequestration, scenic

³ While some of these mutually incompatible relationships are known, many others are still to be discovered. For example, trees can have a positive, negative, or neutral effect on hydrological services downstream depending on soil conditions, slope, rainfall intensity, species mix, and planting density.

⁴ The choice of any environment index will remain subjective, for many environmental services remain unrecognized and uncompensated, as illustrated by white space within the big circle in Figure 2.1.

beauty, and wildlife protection are valued by people globally. Local users are unlikely to pay for services that are not valuable to them, while global users will not pay for local services. Service providers or intermediaries may need either to create separate bundles for local and global consumers or provide a portfolio of environmental services from which buyers can select according to individual preference. Either option, though, will add to the complexity of PES projects. Project managers need to balance high revenues with high transaction costs when selling environmental services as separate entities, and lower returns but with reduced complexity when selling services as a bundle.

In the case of Costa Rica's national PES program, the intermediary organization FONAFIFO has struck this balance by purchasing various environmental services as a bundle from local landowners before unbundling them to sell to different buyers. Thus, watershed services have been sold to local hydroelectric companies, while carbon sequestration services are being marketed globally. The Costa Rica case serves only as an illustration, as each PES project must achieve its own balance between bundling and selling services separately.

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This work is intended to be a living document that will be periodically updated and edited. Updates will be available from the project website. For more information or to send suggestions for changes and additions, see <http://www.oired.vt.edu/sanremcrsp/pes> or contact Michael Colby, USAID/EGAT/NRM, mcolby@usaid.gov

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