Background

• Frontier rural community in "La Sepultura" Biosphere Reserve
• Montane pine-oak forests – a tropical mosaic landscape
• Challenges: eradicate rural poverty and vulnerability, counteract agricultural impact causing forest fragmentation and degradation

Conservation-development actors

Protect forests, value biodiversity & hydrological services

Peasant farmers

Co-produce with nature an array of benefits in their farms, instrumental values

Promote:

- Sustainable intensification of agriculture
- Land use zoning
- (In)direct forest conservation strategies & sustainable forest management projects: e.g. promote pine resin production

Ecosystem service (ES) and social-ecological approaches are proposed as a way to manage protected areas and their surrounding landscapes (Palomo, I. et al. (2014) BioScience 64(3),181-191).

Objective

1. Characterise land use types in the landscape
2. Identify locally relevant ES and assess their supply across the landscape
3. Analyse a case of ES supply and delivery: focus on pine resin production

Results

Land use types

Riparian areas

Valleys bottoms & foothills
9% of area
Medium-High land use intensity

Agricultural land

Valleys & foothills
16% of area
High land use intensity

Open forests

Foothills & foothills
42% of area
Medium land use intensity

Closed forests

Hillsides & mountain ridges
33% of area
Low land use intensity

Figure 1. Land use types, based on farmer's view of the landscape, were characterised in a systematic horizontal point sampling (sampling area = 123 ha).

Ecosystem service supply

We measured and estimated mean values of 18 selected ecosystem properties to quantify ecosystem service supply across the landscape.

Pine resin supply-delivery

Average resin production in a hectare of closed forests is ≈390 kg per year. Yet there is a mismatch between resin supply and delivery, i.e. a resin yield gap, which we here analyse.

Conclusions

• The community’s multifunctional landscape is arranged into diverse land use types, each supplying different sets of ES.
• Delivery of ES and associated benefits to farmers however, are not fully realized, e.g. in pine resin co-production, as they’re affected by multiple mechanisms and factors.

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