Stabilizing the Agricultural Frontier: Leveraging REDD with Biofuels for Sustainable Development


Science and Knowledge (CABS)
Center for Environmental Leadership in Business (CELB)
Conservation International

IEA Bioenergy Task 38:
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Available on-line
Explicitly link the cultivation of biofuel feedstocks with forest conservation and reforestation

REDD + Biofuels
- Ratio of 4:1 -- forest conservation : biofuel cultivation
- Agricultural frontier (deforested 2000 – 2010)

RDL + Biofuels (RDL = Reforestation of Degraded landscapes)
- Ratio of 1:9 – reforestation : biofuel cultivation
- Landscapes deforested prior to 2000
- Degraded soils, second growth forest

Restrict carbon credits to woody perennial biofuel species
- Oil palm, jatropha, eucalyptus

Use revenues from carbon markets to subsidize sustainable biofuels
Spaitalize Policy Model for 5 Case Studies
Identify appropriate landscapes
Oil Palm: Precipitation > 2000 mm
Eucalyptus: Precipitation < 2000 mm

50% of anthropogenic landscape
Oil palm: 7.8 million ha
Eucalyptus: 3.9 million ha

Stratify by eligibility
REDD + Biofuels = 6.3 million hectares
(~10 years of deforestation)
RDL+ Biofuels = 5.5 million hectares
Pará – Brazil Case Study

Forest Conserved
25 million hectares
29% of extant forest in Pará - Brazil

Landscape Reforested
556,000 hectares

Carbon Credits
REDD = 9.2 billion tons CO2
RDL = 168 million tons CO2
Woody biofuels = 1.2 billion tons CO2

Biofuels Produced Annually
23 billion liters ethanol
18 million tons biodiesel
24% Brazilian oil consumption (2005)
2.9 % USA oil consumption
$17 billion yr-1 (100% GDP 2005)
Potential Benefits
Impact on Land Cover

Counter Factual Policy Scenarios
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Biofuel production

Counter Factual Policy Scenarios

[Graph showing biofuel production in Giga Joules (GJ) with categories: Biofuels+FC, Stand-Alone REDD, Business as Usual, Most Likely. The bars are divided into Ethanol and Biodiesel segments.]
Reduce carbon emissions, conserve biodiversity, and promote economic growth in developing countries

Scenario win-win-win