Nicholas Institute for Environmental Policy Solutions
Duke University

Leakage with Forestry and Agriculture Offset Projects: Issues and Options

Brian C. Murray
Director for Economic Analysis
Nicholas Institute for Environmental Policy Solutions
Duke University

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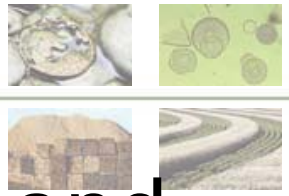
What is Leakage?

- Efforts targeted to reduce emissions in one place simply shift emissions to another location or sector ***where they remain uncontrolled or uncounted***.
- Types
  - International: shifting from an uncapped country to a capped country
  - Subnational:
    - Shifting from a capped source to an uncapped source
    - Shifting from an offset project
      - to a source in the same uncapped sector
      - to a source in another uncapped sector

Why Leakage Occurs

- Leakage occurs
  - "whenever the spatial scale of the intervention is inferior to the full scale of the targeted problem" (Wunder 2008)
  - Rules, regulations, and incentives for action affect only part of the potential participants or emissions sources
- **Economic forces**: Supply/demand supplanted by the project is met elsewhere
    - Formal markets
    - Other institutional arrangements



Leakage as an issue in forestry and agriculture projects

- Leakage is **not unique to forest and agriculture projects**
- But, features of forestry and agriculture make them **susceptible**
  - Fixed land base: Land use change has spillover effects
  - Commodity markets are often broad in scope (regional, national, global)

Example

Afforestation project: agricultural land

Deforestation elsewhere to clear land For agriculture

Why do we care about leakage?

- Erodes the GHG benefits/offset value of a project
- Can be difficult to measure
- Difficult to enforce due to incomplete contracts
- Potential to undermine a project-based offset system

Does leakage really exist?

Ex post analysis of other land-based policies

- ✓ **Wear and Murray (2004)**
  - ✓**Evidence: Net effects of federal timber harvests in Pacific Northwest.**
  - ✓**Harvests elsewhere offset reductions by 84%**
  - ✓**Denominated in timber, not carbon**
- ✓**Wu (2002) – CRP program slippage**

Table 8
Leakage effects[a]

Public harvest timber reductions		
West coast	1200.4	
Inland west	866.8	
Total west	2067.2	
Induced harvests elsewhere		Percent leakage[b]
Western private lands	894.6	43.3%
South	298.9	
US total	1193.5	57.7%
Canada	550.4	
North America total	1744.0	84.4%

[a] All quantities are in million board feet, timber scale (1990–1995 annual average).
[b] Leakage = Induced harvest in area *i* divided by total west public harvest reduction.

Predictive Estimates:
Regional US Forest Carbon Programs

Program targeted at specific activities by region

TABLE 2
Avoided Deforestation Leakage Results (All Quantities Are Percentages)

Region	No Harvesting Allowed	Harvesting Allowed
Pacific Northwest—East Side	8.9	7.9
Northeast	43.1	41.4
Lake States	92.2	73.4
Corn Belt	31.5	−4.4
South-Central	28.8	21.3

TABLE 3
Afforestation Program Leakage Estimates by Region (All Quantities Are Percentages)

Region	Leakage Estimate (%)
Northeast	23.2
Lake States	18.3
Corn Belt	30.2
Southeast	40.6
South-Central	42.5

Source: Murray et al, *Land Economics* (2004)

Predictive Estimates: National-scale Programs

Table 6-2: Leakage Estimates by Mitigation Activity at a GHG Price of $15/t CO_2 Eq.
All quantities are on an annualized basis for the time period 2010–2110.

Selected Mitigation Activities	A GHG Effects of Targeted Payment (Tg CO_2 Eq.)	B Net GHG Effects of All Activities (Tg CO_2 Eq.)	C Indirect GHG Effects from Nontargeted Activity[a] (Tg CO_2 Eq.)	D Leakage Rate[b] (%)
Afforestation only	137	104	–33	24.0
Afforestation + forest management	338	348	10	–2.8
Biofuels	84	83	–1	0.2
Agricultural management	230	231	1	–0.1
Agricultural soil carbon	154	145	–9	5.7

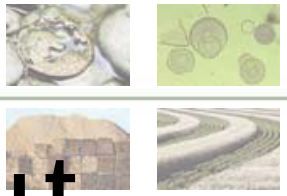
[a] Indirect effects: C = (B – A).

[b] Leakage rate: D = –(C/A) x 100; rounding occurs in table.

Note: Negative leakage rate in D refers to beneficial leakage (i.e., additional mitigation outside the selected activity region, also called positive leakage).

Leakage Myths

- Leakage is the same as “activity shifting”
  - Only if it causes the emissions to shift outside of the accounting/policy boundaries
- All leakage is bad
  - You can get positive spillover effects (but they seem rarer)
- Leakage does not occur if projects are too small to affect the market price
  - Other way around
  - Small projects don’t affect market price because of leakage
    - there are a lot of other market participants who can replace the project’s contribution to the market without disruption



What can we do about leakage?

- Ignore it
- Adjust the cap
- Make the cap comprehensive
  - All emissions get counted
  - Nothing leaks
- Minimize through project design
  - Focus offsets on activities with low leakage potential
  - Minimize local leakage through contracts?
- Discount all credits
  - Estimate leakage (e.g., econometrically)/hold back credits
  - Option: true-up ex post with systemwide accounting

Confessions of a Leakage Estimator …

I'd like to try another way than prediction and discount

Another Way: Systemwide True-up

- Set aside a leakage buffer for offsets
- Measure net changes nationally
- Reconcile project and national accounts
- Challenge:
  - Separating out leakage from natural variation of carbon in the system
  - Work in progress