



Center for  
Clean Air Policy  
Dialogue. Insight. Solutions.

## Counting Forest Carbon Fluxes In Annex 1 Countries Post-2012

Gordon Smith, Ph.D.  
Center for Clean Air Policy/Ecofor  
Future Actions Dialog  
July 2, 2008, San Francisco, USA

## History

- During Kyoto negotiations, concern about
  - » Non-anthropogenic sinks
    - CO<sub>2</sub> fertilization increasing growth
    - Nitrogen air pollution fertilization
  - » Baseline forest growth—especially on unmanaged lands—may be greater than emission reduction commitment
- Many countries had limited information about forest carbon fluxes
- Chose to set baselines using gross forest sequestration and count compliance using net of sequestration and LULUCF emissions
- Multiple, conflicting methods for counting harvested wood products (HWP) [not addressed here]



Center for  
Clean Air Policy  
Dialogue. Insight. Solutions.

## 2008-2012 Forest Accounting Rules

- Party must elect definition of “forest”
- “Unmanaged” forest: Don’t count
- Managed forest: Elect to count or not count
  - » Count stock change, including harvest, fire & insect mortality
  - » Amount of sink or source that is counted is capped, with each country’s cap given in Decision 16/CMP-1, annex
  - » If have removals greater than cap amount, may count extra forest management removal units against deforestation emissions, up to 165 million tonnes CO<sub>2</sub>e for the commitment period
- Afforestation, reforestation and deforestation since 1990: Must count



## Main 2008-2012 “Fixes”

- Don’t count “unmanaged” land fluxes
- Limit amount of forest management credits, by country to “factor out” non-anthropogenic effects
  - » Addressed concern that re-growth of areas harvested pre-1990 would weaken national Kyoto targets
- Net accounting of emissions and sinks for croplands, grazing lands, and revegetation, for both baseline and 2008-2012
- Exception allowing counting growth of pre-1990 forests if deforestation emissions would otherwise cause loss of assigned allowance



## Ongoing Problems

- Forest degradation emissions may not be counted
- IPCC can not give general factors for non-anthropogenic effects
- Fluxes from “unmanaged” forests are not counted
- Some countries have large annual variation in forest carbon flux from wildfire and insect mortality
- Conflicting HWP accounting methods, particularly for counting imports and exports [not addressed here]



## Alternative Accounting Approaches

- Adjustments to current activity-based approach
  - » Minimal change, addressing legal changes
  - » Changing forest management (FM) rules, alternatives:
    - Count net FM flows relative to base year/period
    - Count net FM flows with forward-looking baseline
    - Net baseline & net flux accounting
    - Retain gross baseline-net flux accounting, adding “discount” factor
- Merge afforestation/reforestation accounting with FM
- Count all woody biomass changes on all forest lands



## Adjusting Current Activity-Based Approach

- Advantages
  - » Familiar
  - » Merging afforestation/reforestation (AR) and FM counts simplifies tracking AR lands
- Disadvantages
  - » Ignores fluxes from lands designated as unmanaged
  - » Does not solve inability to factor out and fails to address volatility of natural disturbance emissions
  - » Keeps special exemptions



## Merge AR & FM Land Counts

- Advantages
  - » Merging AR and FM counts simplifies tracking AR lands
  - » Familiar accounting methods
  - » Factors out by ignoring “unmanaged” lands
- Disadvantages
  - » Ignores fluxes from lands designated as unmanaged
  - » Fails to address volatility of natural disturbance emissions
  - » Does not solve inability to factor out



## Comprehensive Biomass Accounting

- Advantages
  - » Counts forest degradation
  - » Accurately counts all land use change fluxes
- Disadvantages
  - » Wildfire and insect mortality may prevent target attainment
    - May address with limits on amounts of sinks and natural sources counted in the current period, with excess carried forward, or retrospective baseline modeling
  - » Does not factor out non-anthropogenic effects
    - May address by modeling baselines and negotiating targets



## Modeling Baselines: Prospective and Retrospective

- Advantages
  - » Prospective modeling can adjust for national circumstances (factor out), especially stand age and LUC historic trends
  - » Retrospective adjustment for extreme fire & insect mortality
- Disadvantages
  - » Requires substantial technical capacity
  - » Some countries will have to increase data collection
  - » Requires negotiation of what adjustments to make retrospectively (can be negotiated in advance)



## Summary

| Possible Solution               | Non-anthropogenic fertilization | Unmanaged forests | Wildfire & insect emissions | Counts degradation |
|---------------------------------|---------------------------------|-------------------|-----------------------------|--------------------|
| Adjust activity-based system    | No                              | No                | On managed forests          | No                 |
| Merge ARD and FM                | No                              | No                | On managed forests          | On managed forests |
| Count biomass fluxes, all lands | Negotiate                       | Yes               | Yes                         | Yes                |



## Lessons from History

- Negotiate accounting rules before negotiating targets
- Parties need to have information on baseline forest fluxes before negotiating targets
  - » We have much better information than in 1997



## Quantification Methods

- Satellite imagery to:
  - » Define forest boundaries and areas
  - » Identify general forest type boundaries
  - » Identify areas with significant carbon stock change
- Ground measurements:
  - » Quantify stock changes within general forest types
  - » Ground work focused on areas with significant stock changes



## Questions

- What general approach to accounting best provides:
  - » Environmental integrity
  - » Cost effectiveness
  - » Equity
  - » Implementation feasibility
  - » Political feasibility
- How ensure accounting of forest degradation?
- How to address non-anthropogenic fluxes?
  - » Main proposals: Carry-forward or retrospective modeling
- What inventory and modeling help is needed?
  - » Should an independent third party do modeling?

