



Additionality and Baselines Is there a better way?

Carbon and Communities in Tropical Woodlands An international interdisciplinary conference

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TRADITION of INNOVATION



Overview

- **Joanneum Research**
- **QUEST - JIFOR**
- **Additionality and baselines**
- **Baselines in existing PDDs and Methodologies**
- **Environmental integrity and cost of estimation**
- **Regional baselines - an alternative**
- **Conclusions**



Joanneum Research

- **One of the largest non-university research enterprises in Austria (www.joanneum.at)**
- **Privately/publicly funded R&D organization**
- **400 employees in 14 institutes**
 - ➔ Institute of Energy Research (28 staff)
- **Research Theme - *Energy, land use and climatic change***
 - ➔ national and international research projects
 - ➔ energy and land resources, resulting greenhouse gas emissions, and their effect on the climate.
- **Our research activities include:**
 - ➔ cooperation in international networks for the greenhouse gas balance of bioenergy systems;
 - ➔ research on the carbon cycle in bioenergy, land use and forestry, sustainability of bioenergy systems
 - ➔ methodologies for evaluation
 - ➔ national and international climate policies.



QUEST - JIFOR

- **“A bottom-up case study that will use relevant scientific knowledge to design and implement a demonstrator project under the Kyoto protocol’s flexible mechanisms”**

- **Exclusively JI projects, in:**
 - ➔ Romania (2)
 - ➔ Russia (2)

- **Project types:**
 - ➔ Reforestation for bioenergy
 - ➔ Forest regeneration and reduced degradation
 - ➔ Forest conservation
 - ➔ Forest management



Additionality

■ Definitions of additionality

→ Environmental additionality

A project is additional if the emissions from the project are lower without the project.

→ Project additionality

A project is additional if it would not have occurred in absence of the CDM.

■ Additionality when combined with emission trading

→ Environmental additionality does not guarantee a reduction in emissions



Additional (Modalities and Procedures)

18. An afforestation or reforestation project activity under the CDM is additional if the actual net greenhouse gas removals by sinks are increased above the sum of the changes in carbon stocks in the carbon pools within the project boundary that would have occurred in the absence of the registered CDM afforestation or reforestation project activity.

- Strictly speaking, this is environmental additionality



Baseline (Modalities and Procedures)

- 19. The baseline for a proposed afforestation or reforestation project activity under the CDM is the scenario that reasonably represents the sum of the changes in carbon stocks in the carbon pools within the project boundary that would have occurred in the absence of the proposed project activity**
- 20. The baseline net greenhouse gas removals by sinks for a proposed afforestation or reforestation project under the CDM shall be established:**
- (a) ...**
 - (b) In a transparent and conservative manner regarding the choice of approaches, assumptions, methodologies, parameters, data sources, key factors and additionality, and taking into account uncertainty;**
 - (c) On a project-specific basis;**
 - (d) In the case of small-scale afforestation and reforestation project activities under the CDM, in accordance with simplified modalities and procedures developed for such activities;**
 - (e) Taking into account relevant national and/or sectoral policies and circumstances, such as historical land uses, practices and economic trends.**



Baseline (Modalities and Procedures)

- 22. *In choosing a baseline methodology..., project participants shall select from among the following approaches:***
- (a) Existing or historical, as applicable, changes in carbon stocks in the carbon pools within the project boundary;***
 - (b) Changes in carbon stocks in the carbon pools within the project boundary from a land use that represents an economically attractive course of action, taking into account barriers to investment;***
 - (c) Changes in carbon stocks in the pools within the project boundary from the most likely land use at the time the project starts.***



The Combined Baseline and Additionality Tool

■ Identify alternative land use scenarios

- Continuation of the pre-project land use;
- Forestation of the land within the project boundary performed without being registered as the A/R CDM project activity (ie. The project);

■ Barrier analysis

- Identify of realistic barriers that prevent alternative land use scenarios from happening
- If only one scenario remains, then it is the baseline
 - If project without CDM – the project is not additional
- If more than one scenario remains, then baseline is the scenario with the highest baseline removals or

■ Investment analysis

- Scenario with most favourable investment indicator

■ Common practice



Baselines in Existing Methodologies and PDDs

■ 8 small-scale

- Existing land-use
- Barrier analysis

■ 7 AR-AM0001

- Existing land-use
- Barrier analysis (7)
- Financial analysis - Benchmark (3)

■ 1 AR-AM0002

- Existing land-use
- Barrier analysis
- Financial analysis - Benchmark

■ 1 AR-AM0003

- Existing land-use
- Barrier analysis
- Financial analysis - Benchmark

■ 2 AR-AM0004

- Existing land-use(s)
- Barrier analysis (2)
- Financial analysis – Benchmark (1)

■ 1 AR-AM0005

- Existing land-use
- Barrier analysis



Environmental Integrity and Cost of Estimation

■ Environmental integrity

- ➔ Real emission reductions
- ➔ Underestimation of baseline will be traded for emissions
- ➔ Project specific baselines are highly subjective and uncertain
 - Barrier analysis has no rigour
 - Financial analysis can be manipulated

■ Cost of estimation

- ➔ Project specific baseline has high transaction costs
 - Conservativeness or effort
- ➔ Is the existing land-use really the baseline?



Regional Baselines A Better Approach

- **20. (e) Taking into account relevant national and/or sectoral policies and circumstances, such as historical land uses, practices and economic trends.**

- 22. (c) Changes in carbon stocks in the pools within the project boundary from the most likely land **USES** at the time the project starts.**
 - ➔ Programme of Activities
 - ➔ Reduce costs for multiple projects
 - ➔ Trade off project specificity for regional trends
 - ➔ WBCSD – Land-use, Land-use Change and Forestry (LULUCF) Guidance for GHG Project Accounting
 - ➔ Sathaye and Andrasko. 2007. Special issue on estimation of baselines and leakage in carbon mitigation forestry projects. *Mitig. Adapt. Strat. Glob. Change.* 12.
 - ➔ Complexity
 - ➔ AR-AM0007 and ARNM0035



Regional Baselines

A More Simple Approach

		Future land-use				
		Forest	Grassland	Cropland	Settlement	Other
Existing land-use	Forest					
	Grassland					
	Cropland					
	Settlement					
	Other					

		Future land-use				
		Forest	Grassland	Cropland	Settlement	Other
Existing land-use	Forest		Deforestation - conservatively ignore			
	Grassland			Conservatively ignore		
	Cropland				Conservatively ignore	
	Settlement	Does not occur				
	Other	Does not occur				

■ Conservatively assume

- ➔ All land starts as grassland
- ➔ All forests grow like project forest



Regional Baselines

A More Simple Approach

- **Simple binomial probability theory**
 - ➔ A discounting of net removals based on probability of AR occurring on the land during the project lifetime
- **A regional land-use change analysis is required**
- **A regional inventory is not required**
 - ➔ Only monitoring of the project is required

$$P_{AR,t} = (1 - p_{AR})^{t-1} p_{AR}$$



Regional Baselines A More Simple Approach

■ Method 1 – Convolution Model

$$B = B_0 + P_{AR} \otimes [P - B_0]$$

■ Method 2 – Discount Model

$$B_t = B_0 + [P_t - B_0] * \left[1 - \sum_{y=0}^t P_{AR,y} \right]$$

B =Baseline

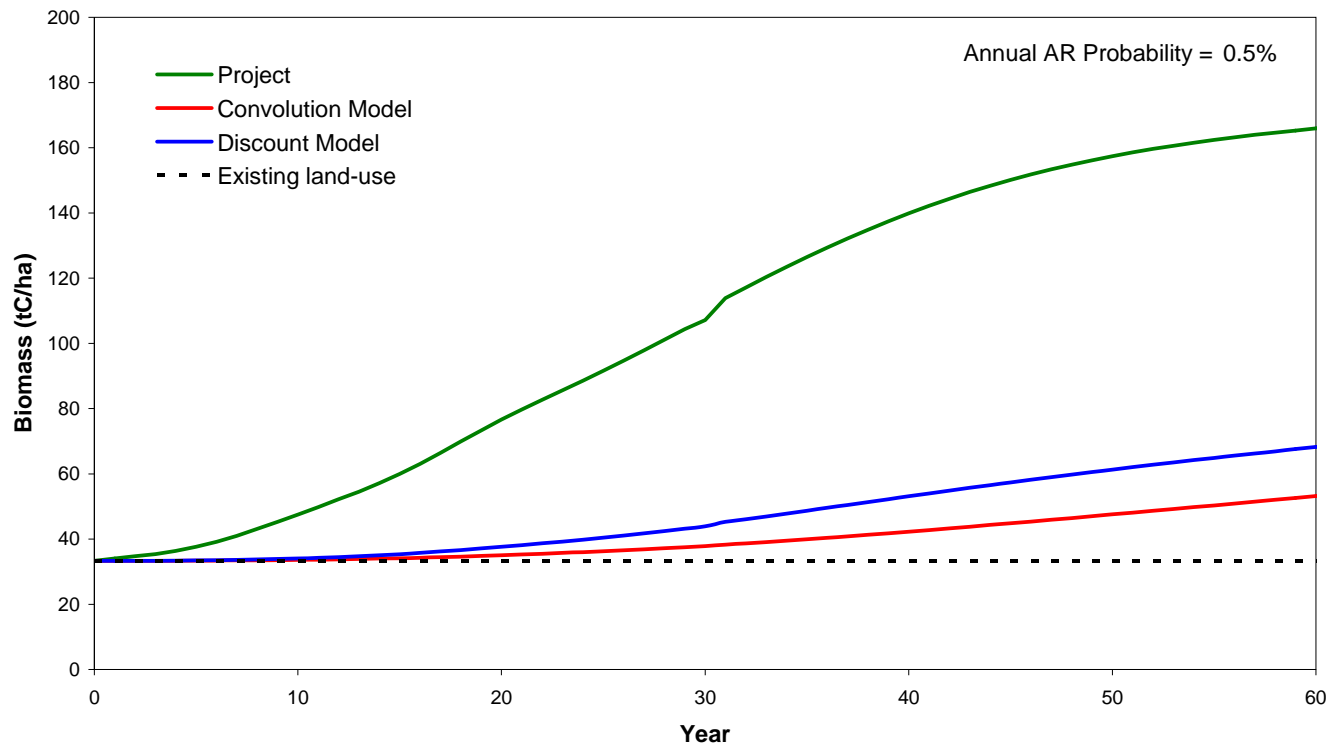
P =Project

\otimes =convolution operator



Regional Baselines A More Simple Approach

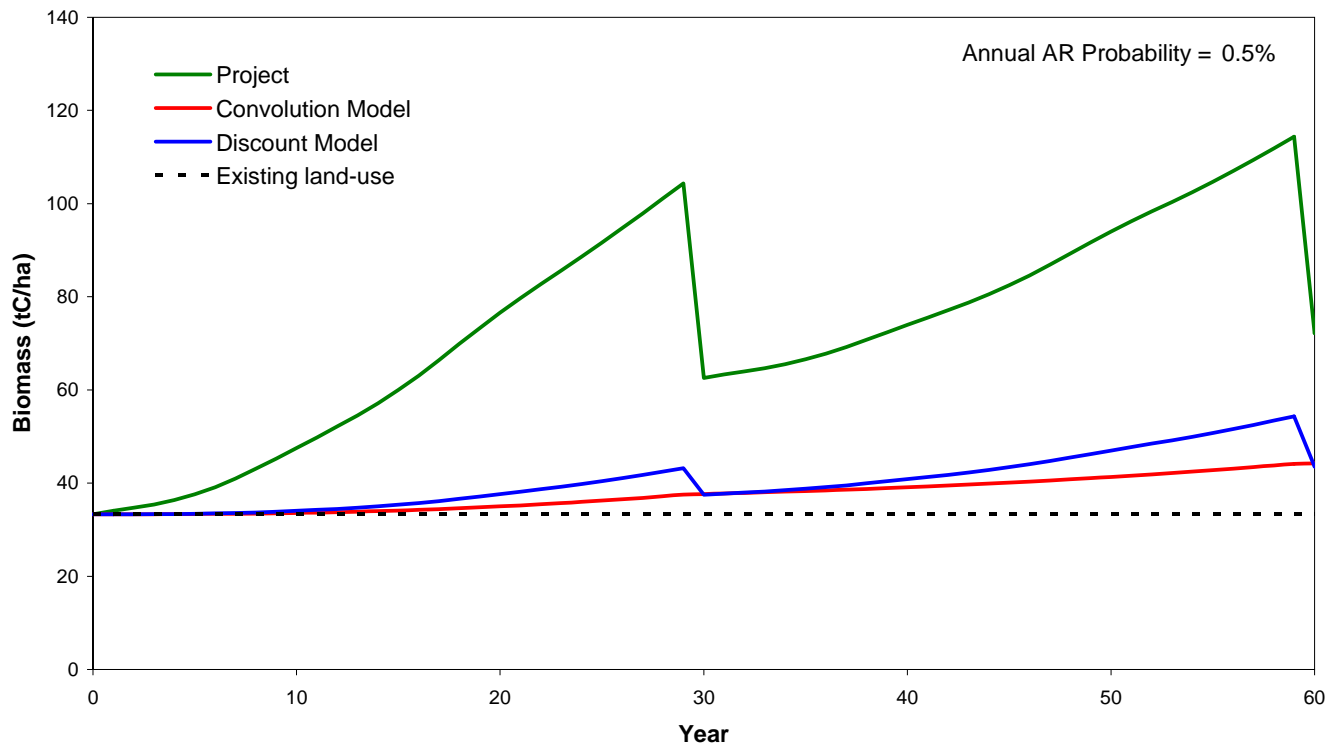
Comparison of Baselines





Regional Baselines A More Simple Approach

Comparison of Baselines





Conclusions

- **Trade-off between environmental integrity and cost of estimation**
- **Project specific baselines are highly subjective and uncertain**
 - ➔ Barrier analysis has no rigour
 - ➔ Financial analysis can be manipulated
- **Existing land-use most often assumed**
 - ➔ Easiest to estimate but is this really the baseline?
- **Regional baselines are a better alternative**
 - ➔ Greater integrity without being overly conservative
 - ➔ Cost effective
 - ➔ Fit with PoA
- **A simple approach based on binomial probability**
 - ➔ Extendable to REDD and IFM ?