Carbon Banking: Creating Flexibility for Forest Owners

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Forests and Climate Change

• Sequestration of atmospheric carbon in trees has been identified as a way of mitigating the effects of greenhouse gas emissions
• Development of systems to bring forest carbon into a broader carbon accounting framework
• Most commonly done by creating some form of carbon asset that is traded in a market
  – Chicago Climate Exchange
  – New South Wales Greenhouse Gas Abatement Scheme
  – New Zealand Emission Trading Scheme
Forest Carbon Assets

• Carbon trading requires a defined carbon asset
  – Chicago Climate Exchange *Carbon Financial Instrument*
    • 1 metric tonne CO₂
    • Contracts in increments of 100 metric tonnes CO₂

• Requires a mechanism for converting tree biomass or growth to a measure of carbon that meets the specific definition of a carbon asset
  – Calculation of CO₂ equivalence
  – Specification of the length of time the asset is under contract
  – Specification of forest management
Key Characteristics

• Carbon trading schemes function as a broker
  – Ownership and liability for carbon remains with the original buyer and seller of the carbon at all times
Key Characteristics

• Carbon trading schemes function as a broker
• Long term commitment to maintain forest
  – NSW GGAS for 100 years
  – New Zealand PFSI for perpetuity with option to exit after 50 years
Key Characteristics

- Carbon trading schemes function as a broker
- Long term commitment to maintain forest
- Restrictions on forest management
  - Commitment to long term forest estate plan
    - Species
    - Silviculture
  - Continuous cover harvest systems
Key Characteristics

- Carbon trading schemes function as a broker
- Long term commitment to maintain forest
- Restrictions on forest management
- Implied ‘optimal’ owner
  - Large scale forest owner with a normally structured forest with constant annual harvest
  - Owner who will never harvest
Above-Ground Coal Deposit
Problems for Small Land Owners

• Size and structure of forests
  – Much of the land that afforestation can take place on is under agricultural land uses
    • Average farm size not very big
    • Agricultural and forestry mix often the optimal land use
  – Much of the forest that could increase sequestration is in small ownership
    • 12 million private forest owners in EU-15 with an average size of 13 ha
    • 58% of forested land in the U.S. is non-industrial private forest
The Preferred Forest
The Problem Forest
Carbon Broker

• Some size and structure issues have been addressed through aggregation or pooling of smaller forests
  – Share costs of developing carbon assets
  – Combined forest structure meets market needs
• Done through a broker or intermediary which does not have ownership or liability
Carbon Broker

Forest Owners

A
B
C
D

Broker/Aggregator

A
B
C
D

Carbon Buyers

X
Y
Z
Problems for Small Land Owners

• Size and structure of forests
• Time frame of commitment
• Loss of management flexibility
• Risk of forest (and carbon) loss
Payment for carbon

• Typically a single payment for long term or perpetual ownership of the carbon
• Risk inherent in a single, upfront payment
  – Market is still developing and dynamic
  – Price of carbon uncertain
• Problem for all market participants
Carbon Banking

- Create a carbon market that is analogous to a capital market and which functions like a financial institution
- Key elements
  - Depositors with varying amounts and commitment terms create a pool of capital that can be separately loaned to borrowers also with varying amounts and commitment terms
  - Interest payment for the use of capital
  - Capital not ‘purchased’, just ‘rented’
Paying for Carbon

• Current system uses an upfront, single payment that is effectively the purchase of a carbon asset
• Change to renting carbon (sequestration) services on an annual basis
  – Derived from the carbon purchase market

\[
\text{Capital Value} = \frac{\text{Annual Value}}{\text{Interest Rate}}
\]

\[
\text{Annual Value} = \text{Capital Value} \times \text{Interest Rate}
\]

  – Derived directly from a (future) carbon rental market
Carbon Rental ‘Yield’ Curve

Increasing Value Of Annual Payment

Borrower

Depositor

Increasing Length Term
Characterising Carbon

• How are A, B, C and D created?
• Allow carbon in individual trees to change
  – Harvest and regeneration
• Create a carbon asset from the ‘average’ presence of carbon in the entire area
• Translate this concept to a carbon bank
  – Pooled assets of a number of owners
‘Depositing’ Carbon

• Forest owner ‘deposits’ (registers) their forest for a defined period of time
• Initial carbon deposit is determined
• Subsequent carbon deposits need to take into account changes to area and stocking
  – Use tables, growth models, annual or periodic measurements, or some combination of these
• Forest owner paid an annual amount based on the minimum carbon sequestered throughout that year
The Carbon Pool

• Annual ‘withdrawals’ due to net harvest reductions and catastrophic events like fire or insect damage
• Annual ‘deposits’ through new forest owners registering forests and net forest growth
• The net balance creates a pool of carbon that the Carbon Bank can rent out
  – Can be subject to a ‘reserve requirement’ to account for unexpected reductions in the carbon pool during a year
‘Borrowing’ Carbon

- Carbon is ‘borrowed’ for a specified period of time at a given rate per unit of carbon per year
- Can be structured similar to a loan agreement
Advantages

• Allows any forest owner to potentially be involved in the carbon market
• Reduces financial risk due to catastrophic loss
• Management flexibility for the forest owner
• Incentive to maintain forest due to current rather than past payment
• Not locked into one value of carbon
• Extendable to other forest services
Issues

• Need to create appropriate carbon assets through the creation of a right to the carbon
  – New Zealand Forestry Rights Registration Act
  – Separate from the land

• Verification and cost of verification
  – Forest owners must still weigh up the relative costs and returns

• Accuracy versus cost of estimate