BACKGROUND TO CARBON SEQUESTRATION

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Background to Carbon Sequestration

1. Following the signing of the Climate Convention in Rio in 1992, and the subsequent conference in Kyoto in December 1997, interest has grown in the potential for forestry measures to mitigate the increase in atmospheric concentrations of the main greenhouse gas, CO_2. Several studies have indicated that, by decreasing the rate of deforestation and by increasing the rate of afforestation, the global potential for enhancing carbon storage in forests may be as much as 60-90 GtC.

2. Forests already play an important role in the global carbon cycle. About 60 GtC is exchanged between terrestrial ecosystems and the atmosphere each year, of which forests account for around 80%. During the 1980s emissions due to deforestation were estimated at 1.6 GtC/yr (±1.0) , the uptake due to the regrowth of forests in the Northern Hemisphere was estimated at 0.5 GtC/yr (±0.5) and several processes including forest regrowth in the tropics, CO_2 fertilisation of plant growth and N-deposition were thought to account for a further sink of 1.3 GtC/yr (±1.5) (IPCC, 1996).

3. A series of measures approved by the Kyoto conference establishes the framework for trading of "verifiable greenhouse gas emissions reductions" between parties to the convention (UNFCCC, 1997). Those countries that adopted binding emissions limits, listed in Annex 1 of the treaty, are permitted to exchange emission reduction credits. Thus, a country exceeding its limit will be able to purchase credits from countries that have reduced their emissions below the required level. Forests planted since 1990 are explicitly included within this part of the treaty.

4. Another instrument, the Clean Development Mechanism (CDM), enables emissions from Annex 1 countries to be offset in Non-Annex 1 - developing countries (UNFCCC, 1997). In developing countries the emissions reductions accruing to specific projects are quantified relative to "baseline scenarios", which are supposed to represent the probable emissions in the absence of intervention. Forestry measures are not yet specifically included within the current articles relating to the CDM. However, given the significance of developing country forests within the global carbon cycle, and the importance of terrestrial carbon fluxes within the national emission inventories of most developing countries, its seems likely that provisions for forestry will be included at some stage.

5. The development of international trading systems for emissions mitigation has been of particular interest to industries, interested in limiting their potential liabilities incurred as a result of "command and control" or tax based policies for emission reductions. Several major corporations, including British Petroleum, Enron, and various US utilities argue that an open market in

emissions reduction credit could reduce the cost of meeting specific environmental targets by up to 80%. The experiences of trading in SO_2 permits and agricultural / fishery quota systems are frequently cited as evidence. British Petroleum is currently setting up an internal CO_2 emission reduction market that will operate between its various divisions.

6. The role of forests within such trading systems could be important as a means of providing a virtual cap to the cost of emission reductions, at least in the medium term. Assessments of various pilot projects around the world indicate that large amounts of carbon may be sequestered by forestry at costs in the range of US$10-30 tC^{-1}.

7. Crediting emissions reductions associated with forestry presents certain difficulties because, unlike release of CO_2 from fossil fuel use, which is essentially a one-off process, carbon fluxes from vegetation are two-way and continual processes. A special report on Land Use, Land Use Change and Forestry was recently published by the IPCC to identify the role of forests and other biotic carbon sinks and the mechanisms that should be used to manage terrestrial carbon stocks. Although the CoP6 meeting in the Hague in November 2000 failed to resolve these issues, it is anticipated that agreement on the role of forestry in reducing carbon emissions will be reached at further meetings in 2001.