Zoltán Somogyi[1], Bernhard Schlamadinger[2], Emil Cienciala[3], Wojtek Galinski[2], Carly Green[4], Giuliana Zanocchi[5], and Kenneth Byrne[6]

JIQ Discussion Platform

Pragmatic approaches to estimating GHG emissions and removals in AR projects

Afforestation and reforestation projects eligible under both Article 6 and 12 of the Kyoto Protocol can have a significant potential for sequestering carbon, while creating multiple additional environmental and social economic benefits. In order to exploit this potential, pragmatic, *i.e.* inexpensive and effective procedures are needed for estimating carbon stock changes.

Afforestation and reforestation (AR) projects are among the options for meeting commitments under the Kyoto Protocol (KP). Establishing new forests can not only sequester carbon but bring a variety of environmental and social benefits: they can improve microclimate, ease efforts in agriculture, supply people with food, forage, timber and firewood, or prevent soil erosion. Establishing new forests can also generate job opportunities. AR projects may be especially important for local communities of developing countries.

So far, only a few AR projects have been initiated with a direct aim to obtain carbon credits, although large areas of land are potentially available. As most provisions for implementing AR projects under the KP have already been agreed on (including the Marrakesh Accords, and the rules and modalities for CDM AR projects), AR projects will be launched soon. Since issues surrounding forestry projects have attracted more attention than other projects of similar mitigation potential, there is an apparent expectation that methods with high accuracy will be used for the estimation of carbon stock changes in AR projects. However, requiring such methods may be cost-intensive or technically unfeasible, and can negatively affect the number of AR projects initiated, thus risking to loose possible carbon credits and the other benefits of forestry projects mentioned above.

Expected costs and project benefits should clearly be balanced in AR projects just like in any other project category. The planned methodology for estimating carbon stock changes should be tailored to the expected amount of carbon fixed and to the local conditions in AR projects, as it is the case in non-AR small-scale CDM projects already agreed. This methodology should be pragmatic, as simple as possible, with a requirement to be accurate at larger scale (*e.g.* a bundle of projects) rather than at a single project scale.

The IPCC Good Practice Guidance identifies three levels of "Tiers" in national level accounting, *i.e.* levels of methodological scrutiny that should be used in GHG emission and removal assessment. The selection of Tier is based on the "key category analysis", *i.e.*, a higher Tier is required for emissions and removals that make up the majority of an inventory. This approach could also be used for projects, so that a Tier 3 method would only have to be used for those changes in carbon stocks and non-CO_2 emissions that make up *e.g.* 90 % of the project GHG effects. Tier 1 or 2 methods, *i.e.* those that allow default values, should be permitted for the remaining 10% of project effects on GHGs. On the other hand, Tier 1 and 2 methods should be entirely sufficient for small-scale AR projects. The use of default, or average biomass expansion factors, or allometric functions, which only require the measurement of basic tree dimensions like breast height diameter, should be acceptable in AR projects. Although monitoring through on-the-ground measurements can be the most accurate method, carbon stock changes may be estimated with reasonable accuracy through default sequestration factors by species and site types (*e.g.* yield tables). This would need to be verified through some proxy variable to demonstrate that trees have actually grown according to expectations.

Estimating baseline stock changes should also be simple, including situations when estimated emissions and removals should be possible to be set to zero. In practice, carbon stock changes need only to be estimated in a subset of the five forest carbon pools. The most pragmatic approach is to omit all pools besides biomass from small scale AR projects, except where there is significant likelihood that one or more of them are decreasing. Litter and deadwood carbon pools mostly increase in AR projects, thus they need detailed monitoring only if the increase could be reasonably questioned. The GPG suggests several methods for assessing the sign of change in carbon stocks.

Simplified monitoring techniques may not only be cost-effective, but can ensure the involvement of local people in the management and monitoring of the project, which may be an important condition for the successful project implementation.

In summary, using simplified and standardized estimation procedures, approved by the CDM EB and made accessible at the CDM website, is crucial for AR projects, especially small scale ones. Likewise, crediting carbon stock changes should also be simplified. Efforts to develop pragmatic crediting systems are under way, see *e.g.* the paper by Schlamadinger et al. to be published at www.joanneum.at/encofor.

1: Forest Research Institute, Hungary, e-mail: somogyiz@erti.hu, 2: Joanneum Research, Austria, 3: Institute of Forest Ecosystem Research, Czech Republic, 4: University College Dublin, Ireland, 5: University of Padova, Italy, 6: University College Cork, Ireland.

Acknowledgement: This research was funded by the European Commission as part of the project CarboInvent (Multi-Source Inventory Methods For Quantifying Carbon Stocks And Stock Changes In European Forests; Contract number EVK2-CT-2002-00157), see www.joanneum.at/CarboInvent.