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Methodology for GHG accounting in tropical peat lands

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Lowland tropical peat lands have become a major hot spot in Earth system dynamics and particularly in driving human-caused climate change. This is the result of large greenhouse gas (GHG) emissions from rapid deforestation, deep drainage and burning as forest is cleared to support the expansion of agricultural crops and forest plantations on peat. A framework and methodology for accounting for GHG flux in tropical peat lands will be presented. This is the outcome of work by the Peat and GHG Group convened by the Australian agency for international Aid and Development (AusAID). The methodology is consistent with the IPCC (2006) GHG accounting Guidelines and is comprised of the following five components:
• change in carbon (C) stocks in above- and below-ground biomass and dead organic matter
• emissions of carbon dioxide (CO2) from biological oxidation
• emissions of non-CO2 GHGs (methane and nitrous oxide) from biological processes
• emissions of CO2 from combustion by fire
• emissions of non-CO2 GHGs from combustion by fire

A brief summary will be given of the key scientific information that underpins the methods proposed for estimating the GHG balance for each of these components. The GHG account for any land area (e.g. REDD project, district, region) is calculated as the sum of the net GHG balance for each of these five components, and this is required on an annual basis. Being IPCC compliant, the methodology can provide a key component of National Carbon Accounting Systems for those tropical countries, such as Indonesia, that have a significant area of peat land. It can also be used to provide GHG accounts that support the implementation of REDD projects.

A step-wise and incremental approach will be needed for the further development of the GHG accounting methodology. Initially, generalized ‘default values’ (derived from review of existing information) are used to estimate GHG change for several of the GHG fluxs, but these will be improved and disaggregated so as to be more site-specific as new information becomes available. The key research required to improve the GHG methodology over time will be briefly discussed. The most significant gaps relate to obtaining better spatial estimates of the carbon and nitrogen stocks in peat, obtaining more reliable quantitative relationships between the factors affecting peat decomposition and CO2 emissions and peat subsidence, and to establishing appropriate emission factors for GHG emissions from the combustion of tropical peats.