

Carbon Stock Movements and GHG Emissions in the State Owned Timber Harvesting and Distribution System in Sri Lanka

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Abstract

The importance of terrestrial ecosystems for the global carbon cycle is undoubted (IPCC, 1996). The main terrestrial compartments involved with fluxes and storage of C are vegetation and soils. In this context, forest plantations and homegardens play major role in CO₂ sink and long term storage. State Timber Corporation (STC) is the authoritative body for timber harvesting in state owned plantations in Sri Lanka and majority of timber for wood based industries in the country is coming from the government owned plantations and homegardens.

The main objective of this study was to assess the embedded CO₂ flux in harvested timber and the flow of embedded CO₂ stock during the processing both as logs and sawn timber and the study was confined to the timber harvesting and processing operations in the timber depots of the State Timber Corporation for the ease of obtaining reliable data. Greenhouse gas emissions of the main processors were estimated using a “cradle to gate” approach where harvesting was taken as the starting point and the timber depots/ showrooms as the final destination. The study covered the embedded CO₂ stock movement of 36 timber species in 18 regions covering 559.4 ha of state owned plantations in Sri Lanka between years 2011 and 2012. Embedded CO₂ of timber stocks of each timber species were estimated using species specific wood specific gravity values and the standard conversion factors. Further the Greenhouse gas (GHG) emissions during the process were accessed. Timber stock movements and transportation data of timber species were obtained from regional timber depots. Data on standing stocks and harvest volumes of state owned plantations were obtained mainly from FORDATA data base and Forest Department’s inventories.

In the primary processing, logs removed from the harvested sites represent approximately 60% of the total volume. Ten percent of the wood is taken for fuel wood from the pruning, 5% is wasted as leftovers at the harvesting site, 23% at the primary processing stage and 2% at the secondary processing phase totalling to 40%. Analysis shows the average monthly embedded CO₂ inflow of timber logs was 20.96 ± 96.74 tons, while out flow was 19.98 ± 89.32 . Average monthly embedded CO₂ inflow of swan timbers were 1.02 ± 5.9 tons while issuers were 0.91 ± 5 tons.

When considering the emissions during the process, 6% of total emissions are at felling stage. Emissions from transportation both inside the site and outside the site made approximately 31.25%. Sawmilling was the highest GHG emitting sub process which contributed 48% from

sawing and 9% from surfacing. 9% of the total emissions were emitted during the drying and there were 2.75 % of other indirect emissions.

Keywords: Embedded carbon stocks, GHG emissions, Carbon flow, Life cycle analysis