CO_2e Accounting and Forest: Principles, Methods, and Challenges for Accounting Professional with reference to India

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Abstract

Global awareness about climate changes brought countries on a round table known as Kyoto Protocol. Because of the interest and responsibilities towards planet parties involved are trying to estimate and manage the CO_2e, the total amount of carbon emitted during the production, processing, and distribution of a product as well as forest change. The final outcome of this exercise is called the product's 'carbon footprint' and the exercise itself is known as 'carbon accounting'. Carbon footprints are expressed in units of CO_2 equivalents (CO_2e). Though there is a cacophony concerned to universally accepted principles of carbon accounting and standards but it is an accounting practice of making scientifically robust and verifiable measurements of GHG emissions. The Kyoto protocol has paves the way for its principles, methods, and practices in the field of GHGs emission field. There are three types of forest carbon accounting methods as developed: stock accounting, emissions accounting and project emission reductions accounting. Fuzzy accounting environment, question about asset type and accounting value (cost or fair market value of CERs) are still in question for carbon accounting in India. Besides this, the various other challenges of forest carbon accounting could be pointed out as its versatile definition, lack of measurement of direct human induced impact on forest and changing pattern of harvested wood product.

Key words: Carbon accounting, CO_2e, Forest carbon accounting and Kyoto Protocol

Introduction

Forest cover 31% of the total land area, primary forest account for 36% of forest area, 30% of forest are used for production of wood and non-wood products, the livelihoods of over 1.6 billion people depend on forest, forest are home to 80% of our terrestrial biodiversity, trade in forest products estimated at $327 billion in 2004, forest are home to 300 million of people around the world (UNDP, 2010). Sequestering and emitting carbon dioxide (CO_2) is a natural phenomenon of Forests and is leading reasons of climate change due to GHGs. There is no single definition globally, and countries have tended to define their forests according to (i) legal, administrative, or cultural requirements; (ii) land use; (iii) canopy cover; or (iv) carbon density (biomass) (Neef et al., 2006). The majority of

definitions are based on a single variable canopy[1] cover exceeding a given minimum threshold. Canopy cover in this context is defined as 'the percentage of the ground covered by a vertical projection of the outermost perimeter of the natural spread of the foliage of plants' (IPCC, 2003). Generally, 'forest' means an area having trees and other vegetation, while ecologically the areas without tree cover not put to human use, like grassy blanks in a wildlife sanctuary or the rocky areas in the forests constitute an integral part of the forested eco-system (FSI, 2009). In an important study (Brenton, Jones, & Jensen, 2009) stated that concern about climate change has stimulated interest in estimating the total amount of carbon emitted during the production, processing and distribution of a product. The final outcome of this exercise is called the product's 'carbon footprint' and the exercise itself is known as 'carbon accounting'. Carbon footprints are expressed in units of CO_2 equivalents (CO_2e). This is because different GHGs have different impacts on the atmosphere so-called radioactive forcing. The GHG data reported by Parties contain estimates for direct greenhouse gases, such as: CO_2 - Carbon dioxide, CH4 - Methane, N_2O - Nitrous oxide, PFCs – Per fluorocarbons, HFCs – Hydro fluorocarbons, SF_6 - Sulphur hexafluoride, as well as for the indirect greenhouse gases such as SO_2, NOx, CO and NMVOC (UNFCC, 1992). A net release of CO_2 from forests emits CO_2 into the atmosphere (source), while a net CO_2 uptake in forests removes CO_2 from the atmosphere (sink) (Kurz, Apps, Benfield, & Stinson, 2002). Required information to analyze forest CO_2 stocks and stock changes must be based on the best available science and compliant with evolving international CO_2 accounting rules (Kurz, Apps, Benfield, & Stinson, 2002). The Green House Gases are changing the earth's energy balance and are already resulting in observed impacts on the global climate system (Houghton, J.T.,Y.Ding, D.J.Griggs et al, 2001). Terrestrial ecosystems play an important role in the global carbon cycle. Counteracting deforestation by paying for the stored carbon is being regarded as a cost-efficient approach to reduce the global greenhouse gas emissions (IPCC, 2007) and (IUFRO, 2009). The net flux of CO_2 from changes in land use is important in the global carbon cycle for a number of reasons. First, changes in land use have caused a net release of carbon to the atmosphere over the last centuries and decades. Estimates vary, however, and the annual net release is more uncertain than other terms in the global carbon budget (Le Qu er e et al., 2009) and (Canadell et al., 2007); Le Qu er e et al., 2009). If the net flux of carbon from land-use change were well enough known, it would help constrain both the residual terrestrial flux and trends in the air borne fraction (Knorr, 2009). Ideally, changes in land use would be defined broadly to include not only changes in land cover (e.g. conversion of forest to cropland), but all forms of land management (Houghtan, 2010). During the first Kyoto commitment period (2008-

[1] The uppermost layer in a forest, formed by the crowns of the trees is called crown canopy.

2012), tree plantation projects were considered eligible for carbon credits under the Clean Development Mechanism (CDM), whereas sustainable forest management was excluded from the CDM for a number of political, practical and ethical reasons (Griffiths, 2007). Since carbon emissions from deforestation represent close to one fifth of all anthropogenic greenhouse gases, an initiative was created at the Climate Conference in Montreal in 2006 to "Reduce Emissions from Deforestation and Degradation" (REDD)[2]. REDD carbon credits are at the moment included only on the voluntary market. The process of respiration and decaying of organic matter or burning of biomass caused forests to release carbon (UNEP, 2009).

Methodology and objective

Carbon accounting with contemporary to Forest carbon accounting in the world with special reference to India is the subject matter of this study. The following is the main objective has been considered under the study:

- To assess the present status of carbon accounting as well as forest carbon accounting around the world with reference to Indian present context of carbon accounting and forest carbon accounting. While studying the carbon accounting concept and practices qualitative aspect plays a dominating role in this study.

Methodology:

Descriptive study has been adopted to become familiar with the carbon accounting terminology, methodology, and side by side the forest carbon accounting through different and available literature.

CO_2 Mass in India: India ranks 10th in the list of most forested nations in the world with 76.87 million ha of forest and tree cover. Like other forests of the world, India's forests also provide critical ecosystem goods and services. However, the significant role of forests in carbon storage and sequestration has increased their importance manifold and brought them to the center-stage of climate change mitigation strategies.

Components- wise CO_2 in India's Forest in 1995 and 2005(millions tones)

Carbon	1995	2005	Incremental Change
In Biomass	2692.474	2865.739	173.265
In Soil	3552.304	3755.811	203.507
Total	6244.778	6621.55	376.772

[2] The UN-REDD Program is the United Nations Collaborative initiative on Reducing Emissions from Deforestation and forest Degradation (REDD) in developing countries. The Program was launched in September 2008 to assist developing countries prepare and implement national REDD+ strategies, and builds on the convening power and expertise of the Food and Agriculture Organization of the United Nations (FAO), the United Nations Development Program (UNDP) and the United Nations Environment Program (UNEP).

The analysis showed that there is improvement in forest carbon stocks on temporal basis from 1995 to 2005. The difference of 376.772 mt between figures of 1995 and 2005 shows the incremental carbon accumulation in India's forests during the period. On yearly basis, the addition of carbon was 37.677 mt ≈ 37.68 mt (say), which means an annual removal of 138.15 mt CO_2 eq (Kishwan, Pandey, & Dadhwal, 2009).

Kyoto protocol and Carbon Accounting: Kyoto Protocol is an agreement made under the United Nations Framework Convention on Climate Change (UNFCCC). The treaty was negotiated in Kyoto, Japan in December 1997, opened for signature on March 16, 1998, and closed on March 15, 1999. The agreement came into force on February 16, 2005, under which the industrialized countries will reduce their collective emissions of greenhouse gases by 5.2% compared to the year 1990 (but note that, compared to the emissions levels that would be expected by 2010 without the Protocol, this target represents a 29% cut).

CDM: The Clean Development Mechanism (CDM) is an arrangement under the Kyoto Protocol allowing industrialized countries with a greenhouse gas reduction commitment to invest in emission reducing projects in developing countries as an alternative to what is generally considered more costly emission reductions in their own countries. The developed country would be given credits (Carbon Credits) for meeting its emission reduction targets, while the developing country would receive the capital and clean technology to implement the project (KYOTO MECHANISM Article 12).

Carbon Credits: Carbon credits are certificates issued to countries that reduce their emission of GHG (greenhouse gases) which causes global warming. Carbon credits are measured in units of certified emission reductions (CERs). Each CER is equivalent to one tone of carbon dioxide reduction (KYOTO MECHANISM Article 17).

IET: Under IET (International Emissions Trading) mechanism, countries can trade in the international carbon credit market. Countries with surplus credits can sell the same to countries with quantified emission limitation and reduction commitments under the Kyoto Protocol. Developed countries that have exceeded the levels can either cut down emissions, or borrow or buy carbon credits from developing countries (KYOTO MECHANISM Article 6).

Indian scenario: As a third category of signatories to UNFCCC, India signed and ratified the Protocol in August, 2002 and has emerged as a world leader in reduction of greenhouse gases by adopting Clean Development Mechanisms (CDMs) in the past few years.

Carbon accounting Methods: Though there is a cacophony concerned to universally accepted principles and standards but it is an accounting practice of making scientifically robust and verifiable measurements of GHG emissions. The Kyoto protocol has paves the way for its principles, methods, and practices in the field of GHGs emission field. Since Carbon accounting is concerned to all the GHG but this study of accounting is directly concerned to Forest Carbon accounting in the world. Although characteristics of forests have been recorded for numerous historical purposes, accounting for carbon is a more recent addition to forest inventories. This follows the growing need to quantify the stocks, sources, and sinks of carbon and other GHGs in the context of anthropogenic impacts on the global climate (Watson, 2009).

Stock accounting: The starting point of forest carbon accounting is begun with the forest carbon stock accounting for emissions and project-level accounting. Establishing the terrestrial carbon stock of a territory and average carbon stocks for particular land uses, stock accounting allows carbon-dense areas to be prioritized in regional land use planning. An early form of forest carbon accounting, emissions, and emission reductions accounting has evolved from the principles established for stock accounting (Watson, 2009).

Emissions accounting: Forest Emission accounting assesses the volume of CO_2 emissions from the forestry sector relative to other sectors. It helps the different nations for setting their goals of emissions targets. Under the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol, countries are mandated to undertake some land use, land use change, and forestry (LULUCF) carbon accounting which are stated below.

Project emission reductions accounting: Project emission reduction accounting for forest is a challenge for both projects undertaken under the flexible mechanisms of the Kyoto Protocol and the voluntary carbon markets. Both necessitate good carbon accounting to ensure that emissions reductions are real, permanent, and verifiable. For projects to generate tradable emission reductions, accounting methods between countries, regions, and projects must be standardized in both developed and developing countries (Watson, 2009).

Obligations for forest Carbon accounting under the UNFCCC and Kyoto Protocol: Parties to the UNFCCC are required to submit national reports on the implementation of the Convention to the conference of the parties (COP). Emissions and removals of GHGs are central in these National Communications, although reporting requirements differ between Annex I[3] and non-Annex I countries. All Parties (Annex I and non-Annex I countries) have to submit national inventories of anthropogenic emissions by source and removals by sinks of GHGs to the COP. However, while Annex I countries must do this annually, there are no fixed dates for submission of the National Communications of non-Annex I Parties (Kyoto Protocol UNFCCC, article 4). Annex I countries are required to account for emissions from direct human-induced activities of a-forestation, reforestation and deforestation in forest areas not existing before 1990. The Marrakech[4] Accords allow net emissions from a-forestation, reforestation and deforestation within the commitment period (2008-2012) to be offset through forest management up to a limit of 33 mega tons (Mt) of CO_2 per year (Kyoto Protocol UNFCCC, article 3.3). Annex I countries can voluntarily account for direct human-induced activities associated with forest management, cropland management, grazing land management and re-vegetation that have occurred after 1990. This voluntary accounting is likely to be conducted where countries believe that emissions in the commitment period will be lower than those in the base period (1990) and so the net impact of these activities is negative, a carbon sink. When this occurs, Removal Units (RMUs) of carbon can be issued up to a specified cap, helping countries to meet emission targets (Kyoto Protocol UNFCCC, article 3.4).

Annex I countries with more emissions than removals from the land use change and forestry sector in 1990 are required to include the Land Use, Land-Use Change and Forestry (LULUCF)[5] sector in their 1990 baseline. This means LULUCF emissions are then included in the calculation of Assigned Amount Units which represent the emissions cap for a country in the commitment period (Kyoto Protocol UNFCCC, article 3.7). Although non-Annex I countries are not obliged to annually account and present GHG emissions to the COP, they are not without forest carbon accounting experience. A small number of forest carbon projects have necessitated accounting for tradable emission reductions, either via the Clean Development Mechanism of the KP or through voluntary carbon markets.

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[3] **The UNFCCC divides countries into two main groups: A total of 41 industrialized countries are currently listed in the Convention's Annex-I , including the relatively wealthy industrialized countries that were members of the Organization for Economic Co-operation and Development (OECD) in 1992, plus countries with economies in transition (EITs), including the Russian Federation, the Baltic States, and several Central and Eastern European States. The OECD members of Annex-I (not the EITs) are also listed in the Convention's Annex-II . There are currently 24 such Annex-II Parties. All other countries not listed in the Convention's Annexes, mostly the developing countries, are known as non-Annex-I countries. They currently number 145.**

[4] **The MA is a set of agreements reached at the 7th Conference of the Parties (COP7) to the UNFCC, held in 2001on the rules of meeting the targets set out in the Kyoto Protocol.**

[5] According to UN climate change secretariat LULUCF is "A greenhouse inventory sector that covers emissions and removals of GHGs resulting from direct human-induced and land use, land use change and forestry activities.

Principles of forest carbon accounting: Good practice for forest carbon accounting

(1) Accurate and precise: Two statistical concepts. Accuracy is how close estimates are to the true value; accurate measurements lack bias and systematic error. Precision is the level of agreement between repeated measurements; precise measurements have lower random error.

(2) Comparable: The data, methods, and assumptions applied in the accounting process must be those with widespread consensus and which allow valid meaningful comparisons between areas.

(3) Complete: Accounting should be inclusive of all relevant categories of sources and sinks and gases, as limited accounting may lead to misleading results. If carbon pools or gases are excluded, documentation and justification for their omission must be presented (for example, for purposes of conservative estimates).

(4) Conservative: Where accounting relies on assumptions, values and procedures with high uncertainty, the most conservative option in the biological range should be chosen so as not overestimate sinks or underestimate sources of GHGs. Conservative carbon estimates can also be achieved through the omission of carbon pools.

(5) Consistent: Recognizing that trade-offs must be made in accounting as a result of time and resource constraints, the data, methods and assumptions must be appropriate to the intended use of the information.

(6) Relevance: Recognizing that trade-offs must be made in accounting as a result of time and resource constraints, the data, methods and assumptions must be appropriate to the intended use of the information.

(7) Transparent: The integrity of the reported results should be able to be confirmed by a third party or external actor. This requires sufficient and clear documentation of the accounting process to be available so that credibility and reliability of estimates can be assessed (Greenhalgh et al., 2006a); (Pearson et al., 2005 a); (IPCC, 2000).

Biomass, carbon pools, and stock accounting: In an important FAO forestry paper (Brown, S., 1997) has stated that Forest biomass is organic matter resulting from primary production through photosynthesis minus consumption through respiration and harvest. In a similar type study of (Westlake, D. F., 1966) has stated that with approximately 50% of dry forest biomass comprised of carbon. Biomass assessments also illustrate the amount of carbon that may lose or sequestered under different forest management regimes. Carbon is lost to the atmosphere as CO2. To convert carbon in biomass to CO2, the tons of carbon are multiplied by the ratio of the molecular weight of carbon dioxide to the atomic weight of carbon (44/12). Estimating the biomass density of forest components is, therefore, the first step in forest carbon accounting.

Approaches to emissions accounting: The purpose of emissions accounting is to quantify the exchange of GHGs between the atmosphere, terrestrial vegetation, and soils through photosynthesis, respiration, decomposition, and combustion. There are two main approaches to emissions accounting: the inventory approach and the activity-based approach, which are outlined below and mathematically represented. Both approaches are supported under IPCC guidance (IPCC, 2003) and are based on the underlying assumption that the flows of GHGs to or from the atmosphere are equal to changes in carbon stocks in the biomass and soils.

Equation 1: Inventory/Periodic Accounting	**Equation 2: Activity-based/Flux Accounting**
$\blacktriangle C = \sum (Ct_2 - Ct_1) / (t_2 - t_1)$	**$\blacktriangle C = \sum [A * (C_I - C_L)]$**
$\blacktriangle C$ = carbon stock change, tones C per year	**A = area of land, ha**
Ct_1 = carbon stock at time t_1, tones C	**C_I = rate of gain of carbon, tones C per ha per year**
Ct_2 = carbon stock at time t_2, tones C	**C_L = rate of loss of carbon, tones C per ha per year**

Accounting for emission reductions: The World Resource Institute (Greenhalgh et al., 2006 b), World Bank and Winrock (Pearson et al., 2005 b), and The Voluntary Carbon Standard **(VCS, 2008)** has tried best to familiarize the standards of accounting for emission reduction in a number of ways. Accounting for emission reductions is most commonly required at the project level, where forestry carbon projects generate emission reductions; these can be traded as offsets either under the Kyoto Protocol or on the voluntary carbon markets. The supplementary principles can be listed as the complexities of baseline establishment, demonstration of additionality, issues of leakage, and the permanence of emissions reductions.

Base line: In a study (Bond et al., 2009) has emphasized that In order to set emission reduction targets, a baseline scenario must be developed. Also called a counterfactual, this baseline scenario estimates what would have happened in the absence of a policy or project. It is required so that the mitigation impact of a project or policy can be quantified. In the forestry sector, the baseline is

particularly important in attempts to reduce emissions from deforestation and degradation, and raises both technical and political considerations.

Additionality: The term additionality meant that a project to be an additional, it must be proven that emission reductions would not have occurred in the absence of this project. This is an important principle when emissions reductions at a project location are used to offset GHG emissions at another location. If there is no additionality, overall GHG emissions will increase as a result of the project activity.

Leakage: In an important study in Bolivia (Sohngen & Brown, 2004) expressed that a leakage is the process by which emissions are reduced in one area but are also impacted outside of the area in question. Although positive leakage is a possibility, concern is
directed to negative leakage, where emissions are merely shifted to another geographical area and fewer, or no, actual reductions are generated by the project activities.

Permanence: Permanence refers to the persistence of emission reductions over time. Unlike other sectors, such as industry, energy, waste management and transport, there is a risk that forest carbon sinks, having delivered emissions reductions, may deteriorate or be depleted over the long term (Watson, 2009).

Carbon Accounting in India: Indian business houses are becoming more responsible towards their corporate social responsibilities and started seeing value in undertaking carbon accounting and reporting it in public forums. Such forums include Carbon Disclosure Project (CDP) and company's Sustainable Development Reports. The Carbon Disclosure Project (CDP) 2010 - India 200 Report presents the strategies adopted by Indian businesses in response to climate change. These strategies have been disclosed, as part of their response to the CDP 2010 questionnaire[6] (WWF, 2010).

ICAI and Carbon Accounting: Accounting Standards Board, The institute of Chartered Accountants of India has issued an Exposure Draft: Guidance Note on Accounting for Self-Generated Certified Emissions Reductions (CERs). Besides this there is not any accounting standards approved and in practice.

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[6] **The CDP 2010 questionnaire is available on the CDP website www.cdproject.net**

Whether CER is an 'asset: 'Framework for the Preparation and Presentation of Financial Statements', issued by the Institute of Chartered Accountants of India, defines an 'asset' as follows: "An asset is a resource controlled by the enterprise as a result of past events from which future economic benefits are expected to flow to the enterprise." From the above-mentioned definition of 'asset' it follows that for a CER to be considered as an asset of the generating entity, it should be a resource controlled by the generating entity arising as a result of past event/s, and from which future economic benefits are expected to flow to the generating entity (ICAI, 2010).

Recognition of CERs: According to the 'Framework for the Preparation and Presentation of Financial Statements' "An asset is recognized in the balance sheet when it is probable that the future economic benefits associated with it will flow to the enterprise and the asset has a cost or value that can be measured reliably." accordingly CERs come into existence when these are credited by UNFCCC in a manner to be unconditionally available to the generating entity. Therefore, CERs should not be recognized before that stage (ICAI, 2010).

Type of asset: CERs are non-monetary assets without a physical form; they do not strictly fall within the meaning of 'intangible asset' as per AS 26. Instead, CERs generated by the generating entity are held for the purpose of sale (ICAI, 2010).

Measurement of CERs: CERs are inventories for an entity which generates the CERs. Therefore, the valuation principles as prescribed in AS 2 should be followed for CERs. As per AS 2, inventories should be valued at the lower of cost and net realizable value. Accordingly, CERs should be measured at cost or net realizable value, whichever is lower.

Cost of CERs Inventories: CERs are inventories for an entity which generates the CERs. Therefore, the valuation principles as prescribed in AS 2 should be followed for CERs. As per AS 2, inventories should be valued at the lower of cost and net realizable value. Accordingly, CERs should be measured at cost or net realizable value, whichever is lower (ICAI, 2010).

Net Realizable Value of CERs: In the determination of the net realizable value of CERs, paragraph 22 of AS 2 reproduced below should be used as guidance: "22. Estimates of net realizable value are based on the most reliable evidence available at the time the estimates are made as to the amount the inventories are expected to realize. These estimates take into consideration fluctuations of price or

cost directly relating to events occurring after the balance sheet date to the extent that such events confirm the conditions existing at the balance sheet date"(ICAI, 2010).

Challenges of Carbon Accounting

Fuzzy accounting Environment: In spite of growing awareness about the climate change and carbon emission none of the nations of the world has developed clear cut accounting principles and methodology for carbon accounting. There is currently no authoritative accounting literature from either the Financial Accounting Standards Board (FASB) or the International Accounting Standard Board (IASB) on accounting for emission allowances (Rohrig & Davis, 2011).

Question about the asset type: Emission allowances, expressed as carbon credits, entitle the holder of such credits to emit one ton of carbon per credit. Emission allowances, as intangible assets, have a number of unique characteristics that challenge the accurate measuring and reporting of their value. Intangible assets are identifiable nonfinancial assets that lack physical substance (Rohrig & Davis, 2011). From a definitional perspective, emission allowances appear to align more closely to intangibles than inventory, although some traditional intangible accounting practices may not be a precise fit for the allowances. For one, intangibles with a finite life are typically amortized over the period based on a unit-of-production approach (or straight line if the previous method is difficult to identify). The two possible accounting value models for initial recognition are "cost" and "fair value." Under both the intangible and inventory models, assets acquired through purchase are commonly recorded at cost (Rohrig & Davis, 2011).

Forest carbon accounting challenges

Definition of Forest: There is a wide range heterogeneous definition of forest around the world therefore what is to be included in the forest and what should be excluded from is a burning question for carbon forest accounting in the world. The substantial variation in forest definition leaves many ambiguities. By utilizing canopy cover as a key characteristic of the forest, the carbon density of a forest is effectively ignored.

Direct human induced impact: Forest carbon accounting aims to capture the direct result of anthropogenic activities and not merely natural variation or indirect human-induced effects. But the factor affecting the forest carbon stocks for example climate variability (heat waves, oscillation); indirect human impact (CO_2 fertilization, Nitrogen disposition, air pollutant effects, length of growing season, fire and insect attack); direct human impact (afforestration, reforestation,

deforestation, cropland management, grazing land management) has a lot of saying on the CO_2 e therefore a matrix form of carbon accounting specially for forest carbon accounting is a need of 21st century.

Harvested wood product: The IPCC (2006) presents four approaches to accounting for HWPs but also offers the option of reporting zero impact in inventories. This default approach has considerable implications for accounting in countries where changes in the stocks of forest products can be more important that standing biomass, for example net importers of HWPs with constant forest areas.

Conclusion

The evolvement of carbon market has knocked the financial door of the world. The accounting world is also in dilemma and trying its best to develop and adopt universally accepted accounting principles for the carbon world. Europe most experienced in carbon trading having it' s involvement for last four years still reeling on the matter how about the carbon accounting be finalized with greater consensus in the world. Carbon traders in the United States have only begun to grapple with the accounting issues of an already complex and unfamiliar market. Moreover, as carbon markets evolve and incorporate new elements, additional accounting challenges will continue to emerge. There is currently no authoritative accounting literature from the International Accounting Standards Board (IASB) on accounting for emission allowances. Forest carbon accounting is just not a Childs play because it is a multi-disciplinary task. It is interlocked and interwoven with expertise from forestry science, ecological modeling, statistics, remote sensing, and at the field measurement level and hereafter the accounting science followed by financial theories is must be in practice. For carbon accounting good and complete information on the sources and sinks of carbon is a pre-requisite for appropriate emission targets and goals. Therefore it is felt that without greater investment in forest carbon accounting neither accounting method could be developed which could be universally accepted under conditions nor the quality of data could be improved. These investments should aim to reduce the complexity of accounting and limit the trade-offs that must be made between costs and accuracy. The carbon accounting in India is in an infant stage therefore it is a need of time that The Institute of Chartered Accountants of India must adopt a concrete policy for the further development of carbon accounting standards as soon as possible. The exposure draft of ICAI is silent about the methodological part of forest carbon accounting for India and it is just based on CERs but what

about carbon offset credits[7], banking and borrowing mechanism in the national and international arena. Fuzzy accounting environment, question about asset type and accounting value (cost or fair market value of CERs) are still in question for carbon accounting in India besides this the challenges of forest carbon accounting could be pointed out as versatile definition of forest, measurement of direct human induced impact on forest and harvested wood product assessment for forest carbon accounting are standing as a barrier for forest carbon accounting in India.

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7 Entities participating in the funding of projects that reduce carbon emissions such as various types of renewable energy may receive offsets that can be used in place of allowances. Some regulators have caps on total offsets allowed and/or a ratio of offsets to allowances that can be used.

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