



Review on Carbon Credit Accounting in India: Recognition, Valuation, and Financial Reporting under Indian Accounting Standards

¹ *Urvashi Kumawat, Dr. Neha Saini*

¹*International School of Business Management, Suresh Gyan Vihar University, Jaipur, India*

Abstract- : Due to the growing concerns about climate change, greenhouse gas emissions and environmental sustainability, the importance of accounting for carbon credits and carbon trading mechanisms has grown significantly all over the world. Carbon credits are a key element in efforts to curb carbon emissions using market-based solutions and promote sustainable industrial and environmental practices. The current Indian Accounting Standards (IndAS), however, do not have a specific framework for accounting carbon credits, which has given rise to problems in accounting carbon credits recognition, valuation, disclosure and accounting practices. Hence, this paper presents a detailed study of the conceptual and practical problems of carbon credit accounting under Indian Accounting Standard (AS-2), AS-26, AS-29 and Indian Accounting Standards (Ind AS) framework of accounting in India. The study is a qualitative review-based methodology, which involves a systematic literature analysis, accounting standards, sustainability reports, research articles and regulatory frameworks related to carbon credit accounting and carbon trading systems. The review also evaluates the recent developments in the field of Environmental, Social, Governance (ESG) Reporting, Carbon Credit Trading Scheme (CCTS) and fair value measurement practices that affect carbon accounting systems. The results show there is very little uniformity in accounting for carbon credits as there are no consistent guidelines for their accounting, and hence differences in classification, impairment, valuation and disclosure practices across the organizations. The study highlights important research gaps and trends, and the importance of establishing a standardized and complete accounting framework to improve transparency, comparability, regulatory compliance and sustainability reporting in India. **Keywords-** Carbon Credit Accounting, Carbon Trading, Certified Emission Reductions (CERs), Indian Accounting Standards, ESG Reporting, Financial Reporting, Sustainability Accounting.

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1. INTRODUCTION

Increased greenhouse gas emissions, climate change and global warming have become one of the most pressing concerns in the world today in the field of environmental sustainability. The world is facing serious environmental and economic challenges due to the high level of carbon dioxide (CO₂) and other greenhouse gas (GHG) emissions caused by rapid industrialisation, urbanisation and over-reliance on fossil fuels. To address these concerns, international organizations and governments have adopted a range of environmental policies and mechanisms to curtail carbon emissions, such as the Global Compact, which aims to achieve the Sustainable Development Goals (SDGs) via sustainable industrial development. To tackle these concerns, there are a number of environmental policies and mechanisms now in place at the international or governmental level that seek to curtail carbon emissions and promote sustainable

industrial practices, including the Global Compact, which pledges to implement the SDGs through sustainable industrial development [1]. The most significant one in this direction is the international agreement for the development of carbon markets and carbon credit mechanisms (UNFCCC – United Nations Framework Convention on Climate Change, Kyoto Protocol) [2].

Carbon credits are tradable certificates that give entities the right to pollute a specific amount of greenhouse gasses (GHGs), usually in the form of one metric ton of carbon dioxide. Any emission reductions beyond the limits will lead to the generation of Certified Emissions Reductions (CERs) that can be traded on carbon markets. This guarantees that the environment is being protected as well as offering monetary opportunities for businesses that are taking steps towards sustainability [3], [4]. The demand for transparent accounting treatment, valuation, recognition and disclosure of carbon credits has grown with the growth of carbon trading activities around the world.

Correspondence to: Urvashi Kumawat, International School of Business Management, Suresh Gyan Vihar University, Jaipur
Corresponding author. E-mail addresses: urvashi.kumawat@mygyanvihar.com

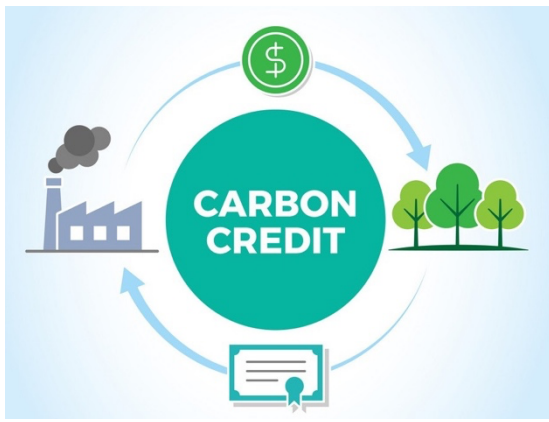


Fig. 1 Carbon Credit[5]

Carbon credits accounting has created new challenges for the accounting profession since the traditional accounting standards were not tailored specifically for transactions involving environmental assets and emission. Accounting treatment of carbon credits in India is through Indirect accounting standards, which are different Indian Accounting Standards (Ind AS) and Accounting Standards (AS) such as AS-2 (Inventories), AS-26 (Intangible Assets), and AS-29 (Contingent Assets and Liabilities). Carbon credits can be seen as inventories or intangible assets [6]. in the context of their use and nature. But because there is no universal accounting framework in place, there has been some variance in the recognition, valuation, impairment testing and financial reporting practices among companies [7], [8].

Multiple studies have pointed to the lack of uniformity and standardization in the carbon credit accounting among institutions and governments. Existing studies have studied the valuation methods, disclosure practices, taxation, fair value measurement and the role of carbon accounting in corporate sustainability reporting. In the Indian context, however, limited studies have explicitly examined how to implement Ind AS, the reliability of the valuations under new carbon markets, and the effect of various accounting treatments on a company's performance [9]. The relevance of carbon credit accounting further intensified with the introduction of India's Carbon Credit Trading Scheme (CCTS), the growing focus on Environmental, Social, and Governance (ESG) reporting and the rising investor interest in sustainability. With the launch of India's Carbon Credit Trading Scheme (CCTS), the importance of ESG reporting, and the growing investor interest in sustainability, the relevance of carbon credit accounting has further amplified in recent years. Corporations today must be more transparent in their environmental asset and liability disclosures and also adhere to new accounting and sustainability standard [10]. It is therefore imperative that the existing literature, accounting principles, valuation methods and disclosure practices on carbon credits be critically examined. Hence, this review paper is an attempt to explore the current literature available on the accounting for carbon credit with particular focus on

the recognition, valuation, disclosure, and reporting practices as per Indian Accounting Standards.

The study also aims at identifying key research gaps, accounting issues and new research trends in carbon accounting and suggests ways to the carbon credit accounting researchers, policy makers, accountants, auditors and corporate managers to develop a more standardized and reliable carbon credit accounting framework in India.

II. RELATED WORK

Arya et al., 2026[11] studied carbon sequestration of agroforestry system as a climate change mitigation approach using *Grewia optiva* in the Himalayan region of Uttarakhand, India. This study compared biomass build up, soil organic carbon stock and stocked carbon sequestration potential and carbon credit production from the different altitudes. The results showed that the highest carbon accumulation and carbon dioxide equivalent storage were found in the middle altitude regions which showed high potential for carbon credit generation and environment friendly. The research identified the importance of agroforestry species in improving ecosystem services, livelihoods of the farmers and in helping implement climate mitigation measures through carbon markets.

Penman et al., 2026[12] developed a structured carbon accounting approach that aims to track and communicate a company's greenhouse gas (GHG) reductions. The study developed a framework that resembles the standard financial accounting system, i.e., a carbon balance sheet and a quasi-income statement to account for carbon assets, liabilities and net emission positions. The focus was on the accountability, performance measurement, benchmarking and gathering of carbon data within and between sectors and institutions. The study also covered the integration of carbon accounting into financial statement analysis to enable the sustainability evaluation and to aid in decision making on carbon reduction strategies and target of net zero.

Bhardwaj et al., 2025[13] they examined the effect of carbon credit accounting practices on the financial performance of the companies in the state of Uttarakhand, India. The research was centered on practices of recognition, measurement and disclosure of carbon credits and their connection with financial indicators like profitability, the utilisation of assets and the valuation of the market. It was found that the combination of qualitative and quantitative approaches to carbon credit accounting and transparency in an organization boosted investors' trust, financial stability, and green financing opportunities. The research highlighted the importance of having robust accounting standards, transparent and disclosure systems to improve the quality of financial reports and environmental sustainability.

Ogunyemi, 2025[14] compared the major international carbon accounting and climate disclosure frameworks, including the GHG Protocol, ISO 14064, EU Corporate Sustainability Reporting Directive (CSRD), U.S. SEC climate disclosure regulations and the International Sustainability Standards Board (ISSB) frameworks. The

Correspondence to: Shraddha Sushant Rokade, Department of Computer Science & Engineering, Suresh Gyan Vihar University, Jaipur

Corresponding author. E-mail addresses: prof.shraddhakarande@gmail.com

study highlighted the methodological variations and issues with the categorization, assurance requirements, data quality and reporting of Scope 3 emissions. The research also explored the consequences of the lack of global harmonization for enterprise-level processes of carbon management, investment decision-making and supply chain decarbonization strategies. The study aimed to provide a consistent reporting framework, providing clarity, comparability, scalability and regulatory compliance of carbon accounting systems.

Reichelstein, 2025[15] and the growing demand for harmonisation and standardisation of carbon reporting systems was emphasized as the climate change issues gain more traction. The study integrated advances in carbon accounting architecture, such as a transactional double-entry bookkeeping system that is able to capture and track carbon emissions' stock and flow variables separately. The study also addressed key accounting challenges such as the level and approach to segmentation, and the accounting for carbon credits. The study recommended to develop universally agreed accounting principles for carbon similar to Generally Accepted Accounting Principles (GAAP) to make carbon disclosure in the companies more comparable, reliable and consistent.

TABLE I: COMPARATIVE REVIEW OF EXISTING STUDIES ON CARBON CREDIT ACCOUNTING, VALUATION, AND FINANCIAL REPORTING PRACTICES

Author/ Year	Study Focus	Metho dology	Key Finding s	Researc h Gap
Larasati (2025) [16]	Examined accounting treatment choices for special funding schemes in Indonesia's carbon credit industry	Case study approach using ratio analysis and Discounted Cash Flow (DCF) valuation under two accounting scenarios (IFRS 15 and IAS 32)	Revenue recognition under IFRS 15 produced better EBIT, credit ratings, and enterprise value compared to equity recognition under IAS 32	Limited focus on Indian Accounting Standards and lack of comparative analysis regarding Ind AS-based treatment of carbon credits

N et al. (2025) [17]	Investigated factors influencing adoption and effectiveness of Carbon Management Accounting (CMA)	Exploratory and quantitative study using survey questionnaire and PLS-SEM analysis	Regulatory and ethical factors significantly influenced CMA effectiveness; difficulties existed in carbon emission quantification and disclosure	Actual corporate implementation of CMA practices was not examined; limited discussion on valuation and financial reporting impacts
Bhardwaj et al. (2025b) [18]	Studied the impact of carbon credit accounting practices on corporate financial performance in Uttarakhand, India	Mixed-method approach using interviews and financial statement analysis	Robust carbon credit accounting practices improved transparency, investor confidence, and financial performance	Limited sample scope and lack of standardized framework for recognition, valuation, and disclosure practices
Joshi & Garkoti (2025) [19]	Evaluated ecosystem carbon storage and carbon credit potential in Himalayan forests	Field sampling, volumetric equations, and carbon sequestration analysis	Oak forests exhibited highest carbon stock and carbon credit value, demonstrating strong sequestration	Focused mainly on environmental valuation and sequestration without addressing accounting recognition

Correspondence to: Shraddha Sushant Rokade, Department of Computer Science & Engineering, Suresh Gyan Vihar University, Jaipur

Corresponding author. E-mail addresses: prof.shraddhakarande@gmail.com

			ation potentia l	on and reporting aspects
Roy & Bhan (2024) [20]	Reviewed design principles and policy requirements for forest carbon markets in India	Critical qualitative literature review	Identified key principles including regulatory clarity, financing mechanisms, and transaction cost minimization for successful carbon markets	Limited emphasis on accounting treatment, financial disclosure practices, and valuation framework for carbon credits

III. CONCEPTUAL FRAMEWORK OF CARBON CREDIT ACCOUNTING AND CARBON TRADING MECHANISMS

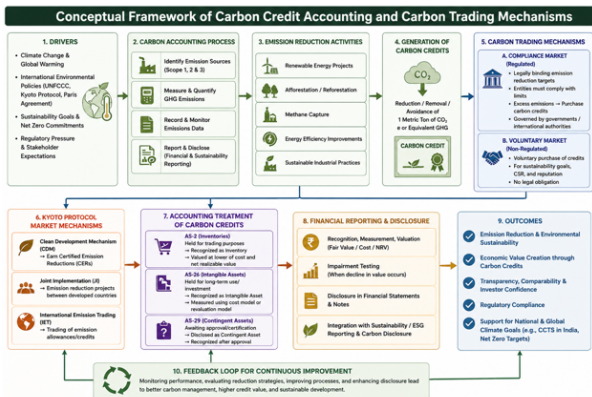


Fig. 2 Conceptual Framework of Carbon Credit Accounting and Carbon Trading Mechanisms

Credit accounting and carbon trading mechanisms. As climate change and global warming become a growing issue, climate change and global warming policies and market mechanisms, both at the global and at the national level, have been formulated. Of these mechanisms, accounting for carbon credits and carbon trading have become important mechanisms for sustainable environmental management and generating economic opportunities for organizations [21]. Carbon accounting" is the process of measuring, recording,

monitoring and reporting the direct and indirect GHG emissions created by business organization [22]. It helps organisations determine the sources of their emissions, assess their environmental footprint and take action to reduce emissions. The idea has become global in scope, since the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol were adopted, which introduced legally binding emission reductions targets for the developed countries. Carbon credits are units of credit for the reduction, removal or avoidance from the atmosphere of one metric ton of carbon dioxide or equivalent greenhouse gas. These credits are generated when an organization achieves success in cutting emissions to a level that is lower than the limit set in the guidelines, through engaging in activities like sustainable industrial processes, renewables projects, afforestation, methane capture or energy efficiency measures.

The Kyoto Protocol established a number of market-oriented instruments to enable countries and organisations to transfer and trade emission reductions, such as Clean Development Mechanism (CDM), Joint Implementation (JI) and International Emission Trading (IET). The Clean Development Mechanism (CDM) is a mechanism under which developing countries can develop highly environmentally friendly projects and receive Certified Emission Reductions (CERs) that can then be sold to developed countries or organisations that do not meet their emissions targets [23].

There are two main market structures of carbon trading: compliance market and voluntary market [24]. compliance market is a market in which the governments and international bodies set the emission reduction requirements and organizations are legally required to comply with the requirements. If the emission level is reached or surpassed, then the companies must either limit their emissions or they must buy carbon credits from other companies. The voluntary carbon market is a market that enables organizations to buy credits voluntarily to meet their sustainability goals, improve their environmental brand and corporate social responsibility commitments.

These markets take all together encourage emission reductions by creating an economic incentive for environmental sustainability. The accounting recognition of carbon credits is a very complex issue since traditional accounting principles were not developed to recognize environmental assets and liabilities. The nature of carbon credits depends on the use they are put to, and they can be considered as intangible assets or inventories. Carbon credits can be treated under Indian Accounting Standards as inventories if it is held for trading purposes, it may be treated as intangible assets if it is retained for long-term use or investment purposes and it may be treated as contingent assets if it is not yet approved for trading.

There has been considerable diversity in accounting for carbon credits practices across organizations, because so far there are no accounting standards that provide specific guidance for carbon credit accounting. The conceptual content of carbon credit accounting thus brings together the

Correspondence to: Shraddha Sushant Rokade, Department of Computer Science & Engineering, Suresh Gyan Vihar University, Jaipur

Corresponding author. E-mail addresses: prof.shraddhakarande@gmail.com

concepts of sustainability and those of accounting for recognition, measurement, disclosure and fair value. It also bridges the gap between financial accounting and sustainability reporting tools like ESG reporting and carbon disclosure projects. The need for a conceptually standardized framework in the carbon credit accounting has greatly increased with the advent of India's Carbon Credit Trading Scheme (CCTS) and the increasing significance of the global focus on green finance. A sound accounting framework can enhance transparency, comparability, investor confidence and regulatory compliance, while also helping to achieve national and global climate objectives.

IV. ACCOUNTING TREATMENT OF CARBON CREDITS UNDER AS-2, AS-26, AS-29, AND IND AS FRAMEWORK

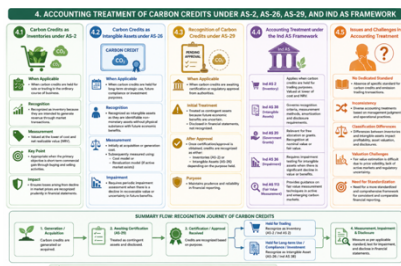


Fig. 3 Accounting Treatment of Carbon Credits under AS-2, AS-26, AS-29, and Ind AS Framework

A. Carbon Credits as Inventories under AS-2

The AS-2 defines the use of carbon credits as inventory. According to the AS-2, carbon credits are inventories. The accounting treatment of carbon credits held for trading or sale in the ordinary course of business are addressed in AS-2 – Inventories. The organizations actively involved in carbon trading generally consider the carbon credits as inventory, since the objective of the carbon credits is to generate income for trading in the market. In this method, the carbon credit is sold at a price of the minimum of its cost and its net realizable value. The treatment of the inventory is deemed appropriate, when the main purpose of keeping carbon credits is for short-term commercial profit from trading in and out [25]. This method will allow for the recognition of any losses as a result of market prices declining in a prudent manner.

B. Carbon Credits as Intangible Assets under AS-26

AS-26 applies in situations where carbon credits are held for long-term strategic use, compliance obligations that are expected to occur in the future, or investment. Carbon credits represent intangible assets since they are clearly defined non-monetary assets with future economic benefits that have no physical substance. In this scheme, the carbon credits are first recognised at the cost of acquisition or generation. These may then be measured under either the cost model or the revaluation model in the cases where there is an active market. The intangible asset approach also implies the periodic re-evaluation of impairment when there is a drop in recoverable

value or uncertainty about future economic benefits flowing from the carbon credits [26].

C. Recognition of Carbon Credits under AS-29

AS-29 on contingent assets and contingent liabilities steps in when carbon credits are in the process of being certified or approved by regulations. Once the initial approval process is unfinalized and the regulatory agencies or environmental authorities have not been approved, the future economic benefits of carbon credits are still uncertain [27]. These credits are, as a result, generally not recognized as an asset, but are disclosed in the financial statements as a contingent asset. After the carbon credit is obtained/certified, the carbon credit can then be recognized as inventories or as intangible assets, based on the enterprise's holding purpose. In this way, prudence and reliability of financial reporting can be maintained.

D. Accounting Treatment under the Ind AS Framework

Collectively, the Indian Accounting Standards (Ind AS) framework regulates the recognition, measurement, valuation, disclosure and impairment of carbon credits. The net realizable value of the carbon credits is the lower of their cost and net realizable value as per Ind AS 2 [28], which applies in situations where the carbon credits are held for trading. Ind AS 38 covers the recognition of carbon credits as an intangible asset, and offers guidance on recognition criteria, measurement, amortization and disclosure. The recognition may be at nominal value or fair value in the following situations, where Government grants or free allocation of carbon credits are involved: Further, Ind AS 36 presumes that carbon credit, which is classified as intangible assets, shall be subjected to impairment testing in case there is a significant decline in their market value or in their expected future benefits. Ind AS 113 also offers direction in relation to the techniques and methodologies for measuring fair value and valuation in active and emerging carbon markets.

E. Issues and Challenges in Accounting Treatment

While several accounting standards can be applied, there are still many issues that remain with respect to carbon credit accounting practices. The lack of a specific accounting standard for carbon credits and emission trading transactions is one of the challenges. The accounting treatment in the financial statements therefore varies depending on management judgment in accounting decisions and also on the various ways in which the activities of the organisations are organised, leading to financial statements not being comparable. The classification of inventories compared to the classification of intangible assets also affects profitability, asset valuation, impairment recognition and disclosure [29]. In addition, developing carbon markets are still plagued by problems of price volatility, as well as the absence of markets and uncertainty over future policies. This has made the need for a more standardized and comprehensive accounting system for carbon credits even more important when it comes

Correspondence to: Shraddha Sushant Rokade, Department of Computer Science & Engineering, Suresh Gyan Vihar University, Jaipur

Corresponding author. E-mail addresses: prof.shraddhakarande@gmail.com

to environmental sustainability and corporate financial reporting.

V. CHALLENGES, RESEARCH GAPS, AND EMERGING TRENDS IN CARBON CREDIT FINANCIAL REPORTING

A. Challenges in Carbon Credit Financial Reporting

The absence of accounting framework particularly a universally adopted accounting framework poses accounting and regulatory issues for the carbon credit financial reporting. The approach to accounting for a carbon credit is different among various organisations and differs with the type of carbon credit and the reasons for its holding. This causes manufacturing and country to be inconsistent in recognizing, measuring, valuing, and disclosing. A very debatable issue in the Environmental Accounting is of AS-2 and AS-26. These differences in classification can have a major impact on the profitability, asset value, and the comparability of financial statements [30].

The other significant issue is linking valuation and fair value measures to carbon credits. The market prices for carbon are not yet regular and steadily available in many economies including India due to the maturing nature of carbon markets [31]. herefore, an appropriate method of valuation, such as replacement cost, historical cost, net realizable value and fair value methods, choice of which is a difficult task for the organizations. The assessment of the impairment of the carbon related assets and the assessment of the carrying value of the carbon related assets is complicated due to the volatility in the markets and the high fluctuations in the price of the carbon credits. Many businesses also aren't disclosing adequately.

Some of the organisations provide information in their financial statements regarding the generation, use, trading of carbon credits, valuations assumptions, and sustainability effects of carbon credits. This opacity has potential to erode trust between stakeholders and introduce doubts regarding greenwashing and misleading environmental statements. Moreover, the accounting for government allocated carbon-credits under Ind AS 20 is distinct, thereby causing the companies to be more complicated to report and to compare [32].

B. Research Gaps in Carbon Credit Accounting Literature

The existing literature on carbon credit accounting outlines a number of research gaps that demand further research in the academic field. While there is growing importance of carbon accounting around the world, not much empirical study has been done with respect to the practical implementation of accounting standards with reference to carbon credits in Indian context. Further research is needed to understand how companies determine the accounting treatment of carbon credits for inventory or intangible asset as related to their business goals and operations [33].

The other significant area of research in its infancy is around valuation method under Ind AS 113 and the

frameworks of valuation for fair value. There are very few comparative studies of the reliability and relevance of different valuation approaches (historical cost, market-based valuation, and income-based valuation techniques) for carbon credits in emerging carbon markets. Likewise, little is known about how various accounting treatments affect the financial performance measures, the volatility of earnings, and investors' view of a firm. Research of impairment testing of carbon credits under Ind AS 36 is also sparse.

The literature on how changes in carbon market prices impact carrying value and impairment in financial statements is limited. Also, there is a lack of literature that connects carbon accounting with the Environmental, Social, and Governance (ESG) reporting, Business Responsibility and Sustainability Reporting (BRSR), and sustainability disclosure frameworks. Hence, efforts are required to establish the consistency in financial reporting of carbon credits and the development of standardized accounting models.

C. Emerging Trends in Carbon Credit Financial Reporting

New advancements in environmental law and sustainable governance have had a major impact on the evolution of carbon credit financial reporting. In recent years, the importance of climate disclosure and sustainable business has increased all over the world, and companies have begun to incorporate carbon accounting into the traditional financial reporting system. The drive for visibility of carbon-related disclosure is picking up pace, as the regulatory framework is becoming more sophisticated, including the introduction of carbon trading schemes, the commitment to reach net zero emissions, and the requirement to report on sustainability. More and more carbon-related disclosures are becoming important because of regulatory initiatives like carbon trading schemes, the net-zero emissions commitment and sustainability reporting requirements [34].

One of the major trends influencing carbon credit accounting practices is the increase in Environmental, Social, and Governance (ESG) reporting. Investors and stakeholders are increasingly interested in disclosures relating to carbon emissions, sustainability risks and strategies to reduce carbon emissions, as well as the impacts on financials of climate change [35], [36], [37]. As a result, companies are increasingly implementing a more detailed and transparent reporting structure to increase the trust of stakeholders and regulatory compliance. Reporting of carbon credits is also getting improved with new technologies. Blockchain-based solutions are emerging to support the implementation of carbon credit transactions, especially regarding the improved traceability, transparency and verification of carbon credit transactions. Likewise, AI and digital monitoring systems are utilized for live carbon monitoring, automatic auditing and verification of emissions. These technologies are expected to aid in the reduction of fraud, reliability and trust in carbon market [38], [39], [40], [41].

Another future trend is the linkage of carbon accounting to other sustainability frameworks, like Business Responsibility

Correspondence to: Shraddha Sushant Rokade, Department of Computer Science & Engineering, Suresh Gyan Vihar University, Jaipur

Corresponding author. E-mail addresses: prof.shraddhakarande@gmail.com

and Sustainability Reporting (BRSR), integrated reporting and international climate disclosure frameworks. However, the increasing use of green finance and sustainable investment practices is prompting companies to increase their environmental disclosures and carbon asset reporting. The progress made towards carbon accounting suggests that it will continue to develop as a vital part of future financial reporting, sustainability governance and environmental accountability systems.

VI. CONCLUSION

With the development of climate change mitigation, reduction of emission and sustainable development practices, the global climate change and carbon credit accounting is gaining more and more attention. With the rising popularity of carbon trading and environmental disclosure projects, the recognition, valuation and reporting of carbon credits in corporate financial statements is of increasing importance. This review focused on the concept of carbon credit accounting, accounting of carbon credits in AS-2, AS-26, AS-29 and Ind AS in India. The study concluded that carbon credits can be accounted for as inventories or intangible assets depending upon their purpose and use, and uncertified carbon credits can be considered contingent assets. There is, however, no accounting standard for carbon credit and this has resulted in the lack of uniformity in the accounting of carbon credit by organisations, such as its classification, valuation, assessment and disclosure of impairment. The review also identified some important aspects which faced difficulties in fair value estimation, lack of active carbon markets, disclosure and uncertainty regarding regulation. The landscape of carbon accounting is evolving globally, with new trends such as ESG Reporting, Green Finance, Blockchain based carbon tracking and sustainability disclosure frameworks. Hence, it is imperative to have a uniform and holistic approach to accounting for carbon credits in India that would increase transparency, comparability, investor confidence and regulatory compliance and pave the way towards India and global environmental sustainability.

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Correspondence to: Shraddha Sushant Rokade, Department of Computer Science & Engineering, Suresh Gyan Vihar University, Jaipur

Corresponding author. E-mail addresses: prof.shraddhakarande@gmail.com

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Correspondence to: Shraddha Sushant Rokade, Department of Computer Science & Engineering, Suresh Gyan Vihar University, Jaipur

Corresponding author. E-mail addresses: prof.shraddhakarande@gmail.com

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Correspondence to: Shraddha Sushant Rokade, Department of Computer Science & Engineering, Suresh Gyan Vihar University, Jaipur

Corresponding author. E-mail addresses: prof.shraddhakarande@gmail.com