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# The Carbon Credit Markets: A Potential Source of Sustainable Growth for Pakistan

**[a] Dr. Abid Rashid Gill**
[a] Editor-In-Chief, Pakistan Journal of Economic Studies (PJES) & Chairperson, Department of Economics, the Islamia University of Bahawalpur Pakistan
Email: abid.rashid@iub.edu.pk

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**Corresponding Author's email address:** abid.rashid@iub.edu.pk

The world economies, primarily driven by capitalist values, were historically focused on maximizing profits and capital growth. This focus has led to substantial productivity and industrial development. Nevertheless, it caused an environmental crisis characterized by significant carbon emissions that resulted in climate change and global warming. It is a global consensus now that climate change has compromised the viability of humanity's social and economic development. The scarcity of water and food, the increase in floods and other natural calamities, and the spread of fatal diseases are the likely consequences of global warming and climate change. Accordingly, many measures are required to cut carbon emissions to combat sustainability crises. As per the United Nations Inter-Governmental Panel on Climate Change (IPCC), carbon emissions must be lowered by 60-80 percent from the 1990s to stabilize the global environment.

The rise of carbon markets, which are quickly gaining acceptance around the globe, is a possible solution to reduce carbon emissions. By trading carbon credits, nations can achieve their climate goals efficiently and economically, which they promised in the Paris Agreement 2015 (Michaelowa et al., 2023). The carbon market functions as a platform on which countries or corporations can trade carbon credits: carbon certificates. The primary goal is to motivate emissions reductions by leveraging market-based changes.

The carbon markets have two main types of structures: cap-and-trade market systems and carbon offsets. The first involves government-imposed limits on emissions. The businesses entities are allocated emission allowances. If an entity's emissions are less than these allowances, it may sell its excess and vice versa. However, carbon offset markets permit companies to invest in carbon reduction projects across other industries or countries to offset carbon emissions and earn the carbon credit.

Understanding the price of carbon credits requires understanding the technical and market factors of the carbon markets. Projects that guarantee the permanent elimination of carbon generally have more carbon credit than projects that focus solely on reducing emissions. Additionally, there are technical aspects of the projects, such as the nature of renewable energy initiatives or initiatives such as clean cooking alternatives and the restoration of forests. Each one has specific criteria that affect the carbon credit price. Market fundamentals such as demand and supply dynamics are the driving force behind the price. The durability of credit and other geopolitical variables, such as the legitimacy of the host nation, are other essential factors to consider (Espelage, Ahonen, & Michaelowa, 2022).

In a globalized world constantly threatened by climate change, the function of carbon markets is more than just mitigation -- they are becoming an impetus to economic growth. According to Fischer & Heine (2023)

the value of global carbon pricing programs was projected to be around $82 billion by 2021. The global GDP of 20221 was about $84 trillion; this makes carbon markets around 0.1 percent of global GDP. Although it appears to be a tiny percentage, the growth potential is astounding, particularly as the international consensus increases and more strict climate targets are established.

The monetary payment for carbon emissions serves two purposes: encouraging organizations to reduce greenhouse gas emissions and generate substantial funds. The funds can finance adaptation measures, improve infrastructure resilience, and help communities affected by climate change. By putting a cost on carbon emissions, these markets can also direct investments towards more sustainable, cleaner technologies and encourage green innovation. Therefore, carbon markets help prevent environmental pollution and provide a financial cushion, ensuring all vulnerable communities can meet the environmental challenges.

The factor endowment of a country also influences the cost of emissions reductions. Labor-abundant countries may have lower prices to reduce emissions than capital-abundant states with technological or infrastructural advantages. This distinction affects the strategies these countries employ, the potential for trading dynamics in the carbon market, and, ultimately, the balance in the price of carbon credits (Allayannis, & Tenguria, 2011).

Pakistan has enormous potential for generating fiscal resources and creating green jobs, thereby boosting long-term sustainability through participating in carbon credit markets. Moreover, this process will encourage investment in renewable energy, transition to a carbon-free economy, and reduce reliance on fossil fuels (Yousuf et al, 2014). Through trading carbon credits in other nations or businesses looking to offset emissions, Pakistan can secure additional resources to support the mitigation and adaptation efforts. Projects like the Billion Tree, Sindh Delta Blue Project, and the possibilities of recent foreign direct investment in agricultural underscore Pakistan's global carbon market potential.

However, at the movement, China and India are the biggest sellers of carbon credit while Europe and North America is the biggest buyer. Pakistan needs a strong monitoring system, capacity building, and accessibility to technology to take advantage of this opportunity. A well-organized national carbon market will be instrumental in combating climate change and unlocking economic potential. It can boost economic efficiency, encourage green investment, and increase resilience to climate change. An initial discussion, policy harmonization, stakeholder involvement, and a gradual implementation strategy are essential to develop a carbon market.

Effective partnerships with international platforms, technology exchanges, and capacity-building initiatives are crucial in shaping Pakistan's progress in the realm of carbon markets as well as a potential foreign exchange stream. Collaborations with technologically advanced countries could lead to innovative solutions tailored to the local environment. In parallel, the training process should be accelerated to develop an experienced workforce adept at the subtleties of carbon trading and the application of advanced technology. Moreover, as credibility is the foundation of carbon markets; therefore, it is essential to have solid monitoring reports and verification methods. Investing in cutting-edge technology with a knowledgeable staff will ensure strict monitoring of emissions reduction projects.

Essential to this plan is a synergistic strategy, which requires close collaboration between the financial institutions, regulatory bodies, and the technological authorities within Pakistan. Utilizing technology such as satellite monitoring machine learning and block chain and satellite monitoring led by institutions such as SUPARCO, MoCC, and the IT ministry could boost the credibility and efficacy of the proposed carbon market. Moreover, promoting synergies between the public and private sectors could be a key to leveraging financial and technical capabilities. A clear and complete regulatory framework, designed together with the appropriate authorities, will help protect the integrity of markets, guiding Pakistan toward a sustainable, prosperous future.

The biodiverse landscape of Pakistan offers a unique opportunity to participate in carbon markets. The conservation of forests, mangrove protection, and wetland rejuvenation preserve the environment and can earn critically needed foreign exchange. As Editor in Chief of Pakistan Journal of Economics Studies, I invite the academicians to focus on exploring the potential of carbon credit markets for Pakistan. We need to identify constraints, institutional bottlenecks, and capacity-building issues of carbon credit markets.

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