

Nature Markets — Valuing Ecological Capital



*Huixin Liu, Executive Director of the Climate Finance Research Center, IIGF, CUF
Ying Cui, Director of Climate Finance Center, IIGF, CUF*

WHAT ARE NATURE MARKETS?

Nature markets, as defined by Nature Finance, an international organization based in Geneva, represent a specialized segment of the economy where nature is explicitly traded and assigned value. From the earliest days of human civilization, nature has been the foundational source of resources for both production and survival, forming the backbone of global economic growth. The concept of nature markets arises wherever economic transactions involve revenues derived directly from natural resources or ecosystems [1]. Since industrialization began, the relentless exploitation of natural resources and the environmental damage from industrial activities have profoundly disrupted the stability of natural ecosystems. As the world faces escalating challenges, including climate change, food insecurity, biodiversity loss, and rising inequality, the development of nature markets has emerged as a crucial strategy for advancing global sustainable development goals. To safeguard, enhance, and sustainably manage natural resources—ranging from the tangible outputs of agriculture, forestry, fisheries, and livestock to ecosystem services like carbon sequestration, water preservation, and soil protection, as well as nature's cultural contributions—clear and robust mechanisms for valuation are essential.

In response to climate change, nations worldwide are actively implementing carbon markets as a mechanism to accelerate the reduction of greenhouse gas emissions. Similarly, to address the ongoing loss of biodiversity, the Taskforce on Nature Markets was established in March 2022 with the objective of fostering positive nature markets that ensure global economic activities interact with nature in a manner that promotes both equity and ecological benefits. This article summarizes theoretical research on nature markets, reviews specific practices both domestically and internationally, explores key issues in their development, and provides recommendations on how China can enhance its efforts in establishing nature markets.

Type	Description	Category	Traded element	Segments
Asset Markets	Markets in which the right to use ecosystem assets with long-lived value are traded	Real assets	Rights to use an entire ecosystem asset and resulting services	Agricultural land, timberland, water rights, <i>biodiversity IP</i> , <i>additional ecosystems assets</i>
Intrinsic Markets	Markets in which provisioning, regulating, or cultural ecosystem services are traded	Products	Use of provisioning services	Hard and soft commodities, legal and illegal wildlife, genetic materials, water rights leases
		Conservation	Conservation of nature for direct economic benefit or altruistic value	Payments for ecosystem services, overseas development aid, philanthropic grants, sustainability-linked debt
		Access	Access to/use of cultural services	Wildlife tourism
Credit Markets	Markets in which credits that reflect efforts to enhance or conserve ecosystem assets or services are traded	Nature-specific credits	Credits that reflect the value of ecosystem services	Mitigation banks, water quality credits, <i>voluntary biodiversity credits</i>
		Nature-related carbon credits	Credits that reflect the value or carbon sequestration or storage	Nature-related voluntary carbon credits, AFOLU sector compliance carbon allowances
Derivative Markets	Markets for financial products which directly reflect ecosystem values or ecosystem risks	Financial products	Financial products directly tied to ecosystem assets or services	Commodity derivatives, nature-related insurance, wildlife NFTs, <i>biodiversity loss insurance</i> , <i>securitization of ecosystem assets</i> , <i>water futures</i>

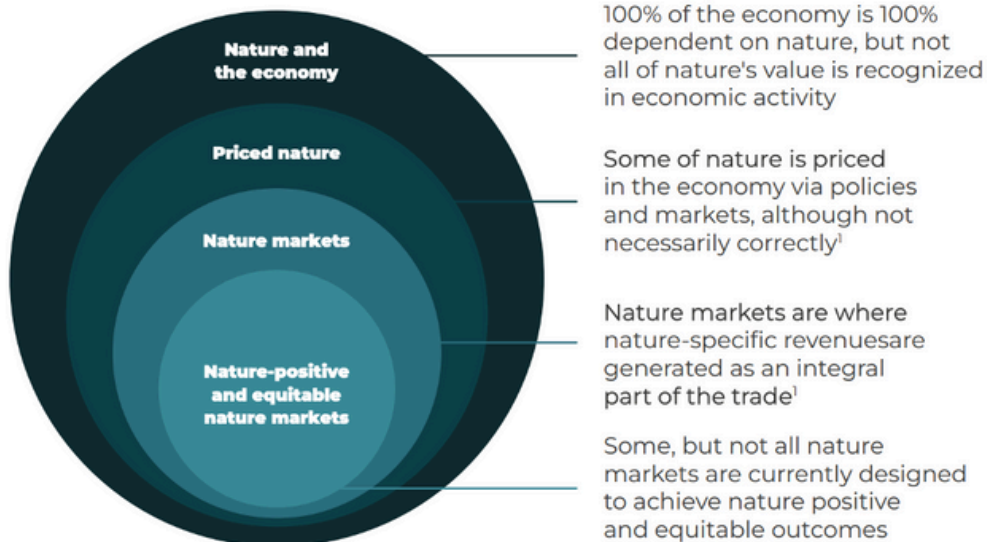
Table 1. The Nature Market Taxonomy [2]
Source: Taskforce on Nature Markets, 2022

Nature markets can be classified into four main categories: asset markets, intrinsic markets, credit markets, and derivative markets. These categories encompass markets for trading nature-based assets, traditional natural products, nature-related credit instruments such as carbon credits, and financial derivatives linked to nature. Table 1 provides definitions and examples of products within each market category.

Nature markets play a crucial role in the economy, and a key focus of their development is how they can drive businesses, markets, and economies toward “nature-positive” and “equitable” outcomes. Shifting from a traditional economic perspective to one centered on nature, the first layer of interaction involves the flow of natural value embedded within economic activities—highlighting the fundamental reliance of economic systems on natural assets. The second layer pertains to the pricing of nature, where the value of nature is often underestimated or undervalued, particularly its ecological and social contributions. The third layer involves markets where nature-related products are traded and generate revenue, aligning with the definitions of nature markets discussed earlier. However, it is essential to note that not all developments within nature markets are necessarily beneficial to nature.

Many established traditional commodity markets, such as those for agricultural products, minerals, oil, and gas, tend to focus on commodity production and trade without fully considering their environmental impacts, which can contribute to biodiversity loss and ecological degradation.

Therefore, at the heart of nature markets, and a fundamental element for the sustainable development of human society, is the concept of “nature-positive” and “equitable” markets. “Nature-positive” emphasizes the protection, restoration, and sustainable use of natural resources and ecosystems, while “equitable” focuses on the equitable distribution of the benefits derived from nature.



THE EVOLUTION OF NATURE MARKETS: NATIONAL AND GLOBAL PERSPECTIVES

Development of Nature Markets in China

Under the guidance of China's eco-civilization concept, the country's nature markets have been steadily developing, gradually establishing mechanisms that promote a nature-positive approach. In 2015, China introduced its overall plan for ecological civilization reform, outlining key principles such as "lucid waters and lush mountains are invaluable assets," emphasizing the recognition of nature's value and natural capital. It highlights that protecting nature is a process of enhancing its value and capital, contributing to productivity and justifying reasonable returns and economic compensation. The advancement of China's ecological civilization reforms has played a significant role in fostering the development of eco-markets tailored to China's unique context, leading to numerous successful practices.

China has made substantial progress in establishing trading systems for various ecosystem asset rights in the asset markets sector. Key mechanisms, such as the transfer of rural land use rights, forestry rights, and other nature-related rights, have been instrumental in recognizing the value of land cultivation and forestry, leading to the creation of effective trading systems. Moreover, China has actively promoted the development of environmental rights markets, achieving notable advancements in areas such as pollution rights, carbon emissions rights, and water rights. These market developments are vital for improving the allocation of nature-related environmental rights and strengthening stakeholder awareness of natural protection efforts.

In the intrinsic markets sector, China has been actively exploring new ways to realize the value of ecosystem services. For instance, in traditional agriculture, regions have been promoting eco-agriculture practices that align with green and low-carbon standards, driving the ecological transformation of industries and protecting rural environments. Initiatives like eco-agriculture, forest wellness tourism, and rural tourism have contributed to the development of eco-farms and eco-economies, embodying the principles of nature-positive outcomes. In February 2022, the Ministry of Agriculture and Rural Affairs issued the "Guidelines for Promoting Eco-Farm Development," setting a goal to establish 1,000 national-level eco-farms by 2025, providing key guidance for enhancing the ecological value of traditional nature-based markets.

In the credit markets sector, China has been actively involved in both domestic and international carbon credit mechanisms related to nature.

Earlier this year, China's voluntary carbon reduction trading market was restarted, and new CCER methodologies, including forest carbon sequestration and mangrove afforestation projects, were introduced. These nature-based CCER projects recognize the carbon sequestration benefits of forests and mangroves, facilitating the monetization of their ecological value through carbon market transactions. Additionally, Chinese market participants have long contributed to pilot carbon markets at the local level and participated in international carbon credit mechanisms focused on forest carbon sinks or blue carbon credits. These mechanisms play a crucial role in quantifying and valuing the carbon sequestration potential of natural assets.

In the derivatives markets sector, China's green finance has witnessed substantial growth, resulting in the emergence of a wide range of financial products. With the establishment of China's green finance framework, both the green loan and green bond markets have gained significant international prominence. The green credit and green bond support project catalogs include industries related to ecological protection and restoration, underscoring green finance policies as crucial pathways for realizing nature-related values. Moreover, local initiatives in green finance continue to broaden mechanisms for realizing nature's value, with notable examples such as GEP (Gross Ecosystem Product) loans, which provide financing using ecosystem services like supply, regulating, and cultural services as collateral. Carbon sequestration loans, backed by forestry carbon sinks, are also key mechanisms in this sector.

International Nature Market Development

International progress in nature market practices can be summarized into two main areas: the development of mature markets that align with nature-positive principles, and the emergence of innovative new nature markets [3].

Efforts to align mature markets with nature-positive principles have seen some international initiatives, though they remain limited in scope, such as:

The EU Deforestation Regulation: In 2023, the EU introduced the Regulation on Deforestation-free Products, aiming to curb deforestation and forest degradation linked to agricultural land expansion. These land-use changes are often tied to the production of commodities such as cattle, timber, cocoa, soy, palm oil, coffee, rubber, and their derivatives (e.g., leather, chocolate, tires, furniture). Under this regulation, any operators or traders placing these products on the EU market or exporting them from the EU must demonstrate that the goods do not come from recently deforested areas or contribute to forest degradation.

Agricultural Commodity Financing: Addressing the deforestation of vast areas in Brazil’s Cerrado region driven by the rising demand for soy, along with associated issues like greenhouse gas emissions and biodiversity loss, the Responsible Commodities Facility (RCF) was established in 2019 on the London Stock Exchange, receiving funding from retailers such as Tesco in the UK. This initiative seeks to promote sustainable soy production and trade in Brazil by developing financial tools that incentivize responsible practices and support the growing global demand for zero-deforestation supply chains.

Forestry Insurance Standards: To reduce the environmental impact of business operations, Swiss Re has established a sustainability risk framework. This framework includes specific policies for the forestry, pulp and paper, and palm oil sectors. It clearly states that, as part of their due diligence process, they will not provide support to clients who have not fully obtained the necessary sustainability certifications.

Commodity Derivatives Regulations: The Sustainable Stock Exchanges initiative has issued guidance on the opportunities and challenges associated with integrating sustainability standards into derivative market regulations or contractual certification requirements. Some derivative exchanges have already adopted sustainability criteria. For instance, the Malaysian Exchange mandates that palm oil futures traders submit traceability documentation.

Focusing on green development goals such as ecosystem protection, innovative nature-positive markets have emerged globally, driving a range of exploratory practices:

Biodiversity credits/offsets: An economic tool involving the creation and sale of biodiversity units. These units fund activities that generate net biodiversity benefits, such as the protection or restoration of species and their habitats. For instance, a candy company sourcing fruits directly from farmers can purchase biodiversity credits to support the protection and restoration of pollinator habitats in local landscapes, helping to sustain pollinator populations crucial for high crop yields while advancing biodiversity conservation efforts. [4]

Wetland Mitigation Banks (WMBs) in the U.S.: A market-based mechanism where third parties create or restore wetlands and sell them to developers to help meet legal mitigation requirements. The aim is to protect wetlands and offset the environmental impacts of development on natural ecosystems. WMBs have expanded to include activities like stream restoration and stormwater management, becoming the preferred approach for compensatory mitigation endorsed by the U.S. government. They have attracted substantial private investment, fostered landowner

and public engagement in wetland conservation, and contributed to advancements in wetland restoration techniques and the growth of the wetland restoration industry, ensuring the long-term balance of wetland resources and their ecological functions.

Payments for Ecosystem Services (PES) involve voluntary transactions where buyers pay providers for specific ecosystem services. In Jamestown, Rhode Island, farmers traditionally harvested hay from their fields twice a year, disrupting the habitats of local grassland birds. Economists from the University of Rhode Island and EcoAssets Markets Inc. raised funds from Jamestown residents willing to support these birds, compensating three local farms for reducing their hay harvest and sourcing hay from other sources. This allowed the birds sufficient time to nest and move off the ground undisturbed by hay harvesting.

KEY DISCUSSIONS ON NATURE MARKETS

Although nature markets offer important pathways for realizing value in nature and biodiversity protection, there are several key issues and challenges that need to be addressed in their design, development, and implementation.

Issue One: Pressure from Current Unsustainable Economic Models

Despite growing global awareness of climate and biodiversity crises, most economic activities continue to undervalue or ignore natural assets, using them in a largely unsustainable and free-access manner [5]. This neglect of natural costs results in significant economic losses through greenhouse gas emissions, water usage, land use, and pollution. The World Bank estimates that the global food system alone generates approximately \$8 trillion annually, while creating around \$12 trillion in negative externalities due to environmental degradation and exacerbated global warming [6]. Moreover, global biodiversity has declined by 68% since 1970 [7]. Given this widespread decline in natural value, the introduction of nature-positive market mechanisms is expected to drive major shifts in regional economies and key industries. However, achieving this will require integrating both penalties for environmental harm and incentives for conservation, fostering nature-positive approaches across both supply and demand sides of the market. The process is likely to demand significant time and resources. In the context of the current global economic downturn, the allocation of these natural costs may place substantial burdens on developing countries and key market players.

Issue Two: Nature markets may deepen inequalities in the global economic structure

Due to globalization and the growth of international trade, natural resources are increasingly distributed across borders. However, the impacts of resource use vary significantly between regions. Estimates show that between 1990 and 2015, the global North extracted 12 billion tons of embodied raw materials, 822 million hectares of embodied land, 21 exajoules of embodied energy, and 188 million person-years of embodied labor from the global South, with an estimated value of \$10.8 trillion based on international prices [8]. Consequently, the measurement of natural value and the development of nature market transactions are heavily influenced by factors such as trade dependence, geopolitical conflicts, and human rights issues. Developing countries, often reliant on natural resource use due to their economic development stages, may face environmental degradation and biodiversity loss, making it more difficult for them to benefit from nature-positive market mechanisms. This further exacerbates global inequalities in access and support.

Issue Two: Nature markets may deepen inequalities in the global economic structure

The ecological value of natural resources is difficult to measure and price accurately, often leading to the underestimation or neglect of ecosystem services, which disrupts their efficient allocation. A large portion of natural value remains unpriced, making it difficult to realize through market mechanisms, leaving unpriced resources vulnerable to unchecked overuse. Additionally, in established markets like carbon credits and ecosystem compensation, issues such as "greenwashing" – where false or exaggerated claims about environmental benefits are made – arise due to inadequate methodologies, insufficient verification, and low transparency, ultimately weakening the effectiveness of these markets.

PROSPECTS FOR THE DEVELOPMENT OF NATURE MARKETS

Introducing nature as a traditionally supply-side production factor, while focusing on the outputs of various stakeholders in terms of nature conservation, is a critical element with the potential to reshape the global economic system. Drawing from the valuable experiences of the global carbon market in enabling countries to jointly tackle the climate change crisis, nature markets exhibit similar external characteristics that require internalization through market mechanisms. However, these markets also present deeper economic impacts and a value system that is harder to quantify

compared to carbon markets. Both domestically and internationally, significant efforts have been made to develop nature markets, and they play an essential role in the ecological civilization strategies of many countries. Based on this, the following recommendations are proposed for the development of nature markets in China:

Continuously improve the policy and legal framework. The development of nature markets requires a solid legal foundation, which should be gradually strengthened through the formulation of policies, the introduction of incentive and regulatory mechanisms, funding provision, and the cultivation of market awareness. In particular, areas such as the carbon trading market, ecological compensation mechanisms, and the natural resource property rights system need further refinement in terms of institutional frameworks. It is also essential to standardize market behaviors and clarify the responsibilities and obligations of governments at all levels, businesses, and social organizations, ensuring policy coherence and stability to provide a stable institutional foundation for the market's growth.

Enhance the development of standards for nature-friendly markets and products. Traditional markets are crucial in terms of market size and long-term demand within the nature market. Reducing the environmental impact of agricultural, forestry, livestock, and fishery production while fostering the development of ecological products will not only mitigate harm to nature but also generate significant nature-related benefits, offering great potential for conservation efforts. To support the growth of these markets and better navigate increasingly strict international trade regulations, it is advisable to strengthen the establishment of standards for nature-friendly products, including their production, certification, trading, and market development. This will help create a robust market for nature-friendly products and encourage sustainable market growth.

Increase awareness of nature conservation and foster greater participation from both institutions and the public. On one hand, financial institutions should be encouraged to integrate climate and biodiversity risk identification, monitoring, and management into their operations. By conducting stress tests and ensuring regular disclosure, these institutions can enhance their risk management capabilities. Additionally, promoting the development of innovative nature-related financial products will help direct more capital toward initiatives that benefit nature. On the other hand, there should be a focus on boosting public education and awareness campaigns. By raising awareness about the importance of nature conservation and fostering a willingness to invest in nature, consumers can be encouraged to adopt habits that support nature-friendly products, ultimately helping to unlock the market value of nature.

References

[1] Taskforce on Nature Markets. The Future of Nature Markets. 2022-04.

[2] Taskforce on Nature Markets. Global Nature Markets Landscaping Study. 2022-12.

[3] Taskforce on nature markets. Global Nature Market Landscaping Study. 2022-12

[4] McKinsey. Biodiversity credits: Lessons for leaders. 2024-04.
<https://www.mckinsey.com/capabilities/sustainability/our-insights/sustainability-blog/biodiversity-credits-lessons-for-leaders>

[5] Taskforce on nature markets. Making Nature Markets Work. 2023-08

[6] World Bank Blogs. (2019). Do the Costs of the Global Food System Outweigh Its Monetary Value? Retrieved from
<https://blogs.worldbank.org/voices/do-costs-global-food-system-outweigh-its-monetary-value>

[7] WWF. A warning sign: where biodiversity loss is happening around the world. 2021.
<https://www.worldwildlife.org/magazine/issues/summer-2021/articles/a-warning-sign-where-biodiversity-loss-is-happening-around-the-world#:~:text=A%20warning%20sign%3A%20where%20biodiversity%20loss%20is%20happening,habitat%20destruction%20due%20to%20unsustainable%20agriculture%20or%20logging.>

[8] Universitat Autònoma de Barcelona. Advanced Countries' Wealth Depends on the Appropriation of Resources and Labour from the Global South. Retrieved from
<https://www.uab.cat/web/newsroom/news-detail/advanced-countries-wealth-depends-on-the-appropriation-of-resources-and-labour-from-the-global-south-1345830290613.html?detid=1345857040508>

[Link to the Chinese version](https://mp.weixin.qq.com/s/p2RnwOhSEVgoOuczml-cCQ)

<https://mp.weixin.qq.com/s/p2RnwOhSEVgoOuczml-cCQ>



**Translation: Daria Gerasimenko, Assistant
Researcher, IIGF, CUFE
daria_gerasimenko@iigf.com.cn**



IF YOU INTEND TO USE OR REFERENCE THE IDEAS PRESENTED IN THIS ARTICLE, KINDLY ACKNOWLEDGE THE SOURCE AS
"INTERNATIONAL INSTITUTE OF GREEN FINANCE, CENTRAL UNIVERSITY OF FINANCE AND ECONOMICS."