



Economic factors influencing conservation of biodiversity in rural regions

Supriyo Acharya¹, Dr. Gargi Basu^{2*}

¹ Lecturer, Department of Zoology, Seth Anandram Jaipuria College, Kolkata, West Bengal, India

² Assistant Professor, Department of Economics, Seth Anandram, Jaipuria College, Kolkata, West Bengal, India

Abstract

This paper discusses economic factors affecting biodiversity conservation in rural areas, focusing on market incentives, livelihoods, and institutional settings. Biodiversity supports ecosystem services vital for rural livelihoods, yet traditional economic systems undervalue these services, leading to land conversion and habitat destruction. Based on policy reports and research, the studies examine economic instruments like Payments for Ecosystem Services, biodiversity subsidies, and market mechanisms to assess their success in aligning incentives with conservation. The research analyses secondary literature on policy frameworks and finds that economic incentives can compensate rural landholders' costs and encourage biodiversity-positive actions. However, findings show incentives require institutional capacity, fair benefit distribution, and integration with rural development plans. Results highlight the importance of livelihood diversification in reducing pressure on natural resources. The research provides policy suggestions for economic-conservation planning, incentive design, and governance for sustainable biodiversity. The study explains the rural economy-biodiversity protection relationship.

Keywords: Biodiversity conservation, rural economies, economic incentives, payments for ecosystem services, livelihood diversification, policy instruments

Introduction

Background of the Study

The variety of life in all its forms and interactions is known as biodiversity, which is an inseparable part of the ecosystem operations and the well-being of humans (Ma *et al.*, 2025). Rural areas and specifically, carry significant shares of the global levels of biodiversity and rural livelihood, yet, are also the hubs of global biodiversity loss to agricultural activities, land-use change, and economic stress (Ma *et al.*, 2025; OECD, 2025)^[8]. Economic activities like farming, logging, and mineral mining tend to destroy habitats, distort ecological mechanisms and endanger the existence of species. Nonetheless, biodiversity also performs several ecosystem services provisioning, regulating, cultural, and supporting, which support rural economies and human wellbeing (Wang *et al.*, 2024)^[13].

Although biodiversity is vital, economic interests often tread on environmental sustainability, particularly in rural areas with low income where financial interests of the short-term advantage land changes and excessive exploitation of resources (OECD, 2025). As an illustration, insufficiency of the valuation of the ecosystem services in economic planning may obscure the fact of the true cost of the loss of biodiversity on the rural economies and therefore inefficient responses to the policy, underestimating the role of nature in human wellbeing and economic stability. Other recent ecosystem valuation techniques including the study done on the Mula-Mutha river ecosystem have shown that the ecological assets may be converted into significant economic value of the economic system which is traditionally focused on economic systems that would not take into consideration the complete value of nature (Times of India, 2025)^[11].

Conservation through economic incentives, such as Payments for Ecosystem Services (PES), biodiversity-friendly subsidies, and financial instruments to support sustainable land management, have become common as

ways of ensuring that the rural livelihoods are in line with the conservation results (OECD, 2025). To create the policies that tackle the issue of rural development and protection of biodiversity, an economic and ecological approach is essential (Ma *et al.*, 2025)^[8]. This paper places the economic factors at the centre of the determinants of the outcome of conservation of biodiversity in rural regions through examining the role of the market forces, income options and incentive mechanisms in determining conservation decisions.

Problem Statement

Loss of biodiversity in the rural areas is not caused by the ecological factors alone but by the underlying economic processes that affect the decision to use land, the choice of livelihood practices and policy decisions. The existing conservation efforts do not pay much attention to these economic drivers leading to poor policies that do not effectively involve the rural stakeholders. The growth of agriculture, poverty, and economic non-diversification provided incentives that were short-term oriented in terms of returns instead of long-term ecological resilience. Although ecological studies have expounded on the process of biodiversity loss, not much has been done in incorporating economic analysis in conservation practice and policy making. Also, economic assessment of ecosystem services (a tool, which may help justify conservation investment), is often not included in the planning and budgeting of rural development, and thus, the biodiversity positive interventions are underinvested.

The issue is made worse by the fact that no data exists on the effects of economic incentives as through PES or biodiversity subsidies on conservation behaviour on a household or community scale. Devoid of clear-cut evidence on how economic factors are related to conservation outcomes, policy makers are poorly placed to come up with interventions that are effective and

economically viable. To fill this gap, an analytical framework is needed that puts economic aspects as the core in biodiversity conservation plans of the rural landscapes.

Aim and Objectives of the Study

Aim

This study seeks to critically examine the economic issues that affect the outcomes of biodiversity conservation in rural areas and the policy mechanisms that would be able to reconcile the economic development of the rural areas with the sustainability of the ecology.

Objectives

1. To look at how economic incentives and disincentives such as subsidies, market forces and alternative livelihoods influence the consideration of biodiversity conservation choices.
2. To assess the efficacy of the economic instruments with a positive impact on biodiversity like Payments for Ecosystem Services (PES) and eco-subsidies in a rural setting.
3. To determine how the rural livelihood forms such as agricultural income and off-farm opportunities affect conservation behaviour and biodiversity outcomes.
4. To present evidence-based policy suggestions that would combine both economic and conservation objectives of sustainable biodiversity management.

Research Questions

1. What is the role of economic incentives and market forces in the choices made by rural households in conservation of biodiversity?
2. How can economic valuation and incentive schemes including Payments for Ecosystem Services (PES) be used to ensure conservation of biodiversity in rural settings?
3. What is the impact of alternative livelihoods and income diversification on the willingness of the rural population to conserve the environment?
4. How can rural economic development be brought into concentration with the biodiversity conservation goals by rational policy intervention?

Scope and Significance of the Study

This paper concentrates on the economic factors that lead to biodiversity protection in rural areas and compares the incentive mechanism and livelihood systems in a comparative manner. It compiles the recent findings on the economic tool in conservation and measures their relevance in policy development. The results of the study have implications to policy formulators, development practitioners and conservation organisations interested in developing interventions that could balance rural economic wellbeing with long-term biodiversity sustainability.

Literature Review

1. The meaning of Biodiversity and Rural Conservation

According to Le Quere (2024) ^[4], biodiversity is genetic, species, and ecosystem diversity, necessary to provide ecosystem services that support rural economies and human survival. Examples of provisioning services include food, fuel and pharmaceuticals, while regulation services include pollination and water purification, and cultural services

include recreation and identity (Wang *et al.*, 2024) ^[13]. Rural livelihoods that rely on natural capital like agriculture, tourism, and resource extraction are based on these services. The intricate interactions of species and environments mean harm to one element can cause ecological and economic effects.

Ngongolo and Kyando (2025) ^[7] point out that conserving biodiversity in rural communities requires sustaining ecosystem services and balancing human needs. Biodiversity loss affects ecosystem resilience, exposes them to climatic impacts, and decreases natural resources that rural populations rely on (Ngongolo & Kyando, 2025) ^[7]. Rural biodiversity is connected to socio-economic development objectives and should be the focus of rural conservation policies. The approach to biodiversity conservation in rural areas extends beyond ecological conservation to incorporate human, economic, and cultural well-being.

Aziz (2024) ^[1] noted that integrating biodiversity preservation in rural economic development should consider biodiversity as both a biological resource and provider of ecosystem services with tangible economic effects. Due to threats from land use changes and agricultural activities, conservation has become an ecological and socio-economic necessity. These definitions form the basis for examining economic factors in conservation decisions.

2. Economic Theory Connected to Conservation

Dasgupta (2023) ^[3] stated that classical economic growth models do not reflect biodiversity value sufficiently as they consider natural capital part of economic system externalities, not its being. This economic review points to market failures, particularly public goods and positive externalities related to biodiversity, as causing suboptimal conservation outcomes unless corrected by policy instruments like taxes, subsidies, or direct payments (Dasgupta, 2023) ^[3]. According to economics theory, resource users can make decisions representing actual social and ecological value through internalizing biodiversity benefits via suitable incentives.

Ma *et al.* (2025) generalized ecological and economic models, stating that economic valuation techniques like contingent valuation and cost benefit could measure ecosystem services and support conservation policies (Ma *et al.*, 2025). They suggest market failures can be solved through economic tools like Payments for Ecosystem Services (PES) that would compensate land managers to maintain ecosystem services and align private incentives with society's ecological objectives. PES logic is based on economic theory as a tool reconciling biodiversity conservation and economic development.

Le *et al.* (2024) ^[4] showed that Payments for Ecosystem Services Programmes (PESPs) focus on integrating environmental management with poverty reduction through financial incentives based on conservation results (Le *et al.*, 2024) ^[4]. This two-fold goal reflects environmental economics perspectives requiring environmentally sound and socio-economically just strategies. However, economic theory cautions about possible traps including win-win solutions, where distributional effects on local livelihoods are not properly considered, requiring careful design and implementation.

3. Economic Factors that Influence the Biodiversity in Rural regions

Wang *et al.* (2024) ^[13] discovered that Payments of Ecosystem Services (PES) programmes in China affected

land use choices, reducing farm poverty but having opposing impacts on non-grain cash crops, demonstrating the complex interaction between economic incentives and rural land-use patterns (Wang *et al.*, 2024) ^[13]. They highlight that while PES may alleviate economic strains leading to biodiversity decline, households respond to other living and working incentives influencing conservation behaviour. This shows that considering the socio-economic context of economic drivers is important.

Ngongolo and Kyando (2025) ^[7] found that biodiversity loss in rural areas is mainly caused by increased agricultural activities, grazing, and resource extraction, but exclusionary conservation policies harm livelihoods unless balanced with economic alternatives (Ngongolo and Kyando, 2025) ^[7]. In regions with limited economic opportunities, rural populations often prioritize immediate income over long-term ecological outcomes, increasing biodiversity pressures. Thus, economic forces like job opportunity, market access and asset ownership influence land-use choices.

Leenders and Heijblom (2024) ^[12] examined ecosystem service payments and how translating ecosystem services into financial rewards can make land management more sustainable (Van Leenders and Heijblom, 2024) ^[12]. They found that PES and market-based tools can reduce biodiversity loss through direct conservation-based compensations. However, they emphasize that scaling such mechanisms requires strong legal provisions, adequate financing and proper targeting of behaviors. Aziz (2024) ^[11] noted that rural economic activities like agriculture support local food security and income, yet traditional agricultural subsidies promote intensification and monoculture, harming biodiversity (Aziz, 2024) ^[11]. Economic drivers can be reformed through subsidy systems to incentivize biodiversity-friendly practices. These works show that economic factors must be interpreted within socio-economic processes in rural areas to achieve improved conservation performance.

4. Economic Incentives and Conservation Results

Batpurev (2025) ^[2] examined PES scheme design and identified issues like poor targeting of high biodiversity zones, administrative complexity and insufficient funds which may compromise conservation effectiveness (Batpurev, 2025) ^[2]. He argues that proper design and execution of incentive systems including decisive criteria, fair benefit distribution and performance evaluation are key factors for meaningful conservation benefits.

Le *et al.* (2024) ^[4] indicated that PES programmes could help conserve biodiversity and reduce poverty when implemented with rural development plans (Le *et al.*, 2024) ^[4, 12]. They warn that PES results may be temporary or discriminatory without sustainable funding and community involvement. Evidence shows economic incentives work best when aligned with local livelihood priorities and supported by enabling institutions.

Ma *et al.* (2025) emphasized biodiversity-friendly subsidies and policies in expanding conservation initiatives, noting that redirecting harmful subsidies toward biodiversity-friendly intervention strengthens conservation while supporting rural development (OECD, 2025) ^[8]. These insights show economic incentives are necessary but insufficient; they must be part of integrated policy packages for lasting conservation benefits.

Research Methodology

1. Research Design

The current research project is based on the descriptive-analytical research design to investigate the impact of economic factors affecting the conservation of biodiversity in the rural areas. The descriptive-analytical design will fit in investigating the relationships among variables and synthesising the existing evidence on the policy, incentives and livelihood interactions with biodiversity outcomes (OECD, 2025) ^[7]. The research is a synthesis of qualitative review of policy frameworks with a systematic examination of the literature on the empirical outcomes of economic tools like Payments for Ecosystem Services (PES), biodiversity-positive subsidies, environmental taxes, and other incentive tools to find out the patterns and causal relationships.

The study assumes the conservation outcomes of biodiversity as dependent variable that is affected by independent economic variables which include market incentives, livelihood alternatives, and policy tools. It explains the effects of these determinants of economic factors on the behavioural reactions of rural households and institutions to conservation based on evidence around the world synthesised by the policy organisations and peer-reviewed research (OECD, 2025; Wang *et al.*, 2024) ^[6, 13]. This analytical logic is developed on the basis of the Sustainable Livelihoods Framework (SLF), the conceptualisation of the relationship between economic capital and incentives and resource use decisions, and ultimately ecological health. The design can explain both direct and indirect economic effects on conservation outcomes by systematically comparing evidence across contexts.

The descriptive-analytical method allows the synthesis of a wide range of literatures, such as economic reports, policy documentation and case studies, in one single framework that informs policy-oriented suggestions.

2. Data Sources

The proposed study uses the source of secondary data based on the review of scholarly sources, reports on international policy, and grey literature published between 2023 and 2025 ^[6]. Thematically based reports on biodiversity incentives, global frameworks of scaling biodiversity-positive instruments, and empirical research of the working of economic mechanisms on biodiversity conservation are key sources. One significant analytical point of focus is the Organisation for Economic Co-operation and Development (OECD) report about biodiversity incentives that summarises the findings on direct and indirect economic tools like PES, subsidies, fees, and tradable permits (OECD, 2025) ^[8]. Other secondary sources are based on PES research studies that report the outcomes to examine the relationships between PES and rural livelihoods and land use (Wang *et al.*, 2024) ^[13].

Data sources inclusion criteria were: (1) relevance to economic incentives or policy tools to biodiversity; (2) publication date within five years; (3) full text access in open/ institutional repositories; (4) evidence or frameworks relevant to rural socioeconomic contexts. This left out those sources who were mainly concerned with ecological modelling but not with economic analyses.

3. Analytical Framework

The analysis framework operationalises the economic determinants of conservation of the biodiversity by

connecting economic instruments, livelihood structure and policy interventions with the conservation outcomes. The nexus of this framework is the economic incentives-behaviour-conservation nexus in which realms of economic incentives manipulate household or landholder behaviour to influence ecosystem health. In this context, Payments for Ecosystem Services (PES) are viewed as a paradigmatic economic measure intended to remunerate the landholders in a conservation effort, therefore, internalising the externalities generated by conventional agricultural or extractive activities (OECD, 2025). PES has been implemented with other positive incentive tools like biodiversity-positive subsidies, environmental taxes, and fee-based instruments that correct incentive and avoidance mismatch between the private economic interests and the conservation objectives of the public.

Livelihood diversification and market access are also identified as modulators of conservation decisions to be included in the framework. The rural households are involved in land use on a comparative livelihood returns therefore economical alternatives to the livelihood activities like off-farm jobs or ecotourism can eliminate the reliance on biodiversity-destroying activities. The Sustainable Livelihoods Framework (SLF) adopts this line of analytical perspective by proposing that resource dependency and conservation behaviour are determined by economic capital and institutional support. This framework subsequently informs the results interpretation and policy

recommendations which would help in balancing biodiversity protection and economic development.

4. Methods of Analysis

The research uses comparative thematic analysis to generalise policy report patterns and empirical results. The policy frameworks, including the OECD biodiversity incentives compendium, are coded in terms of the type of economic instruments, target groups, and reported outcomes (OECD, 2025) [8]. Comparative analysis evaluates consistencies and inconsistencies in the effect of economic incentives in rural settings, both in the direct effect on conservation and indirect effect on livelihood.

Thematic analysis is supported by a trend analysis of the use of incentives at international and national policy levels, assessing the impacts of incentive mixes on conservation. Policy impact mapping also shows the cause effects between economic instruments and indicators of biodiversity.

5. Ethical Considerations

In this study, secondary data, which are publicly accessible, is solely used, which excludes the risks to human subjects and confidential information. Correct evidence attribution, clear methodology and prevention of misrepresentation of source findings are among the ethical standards. The integrity of data can be ensured because authoritative reports and peer-reviewed evidence are cited.

Table 1: Economic Incentive Mechanisms and Conservation Linkages

Economic Instrument	Target Group/Beneficiaries	Intended Behavioural Change	Link to Biodiversity Conservation
Payments for Ecosystem Services (PES)	Rural landholders / communities	Adopt land uses that sustain ecosystem services (e.g., maintain forest cover)	Compensates opportunity cost, reduces conversion of natural habitats
Biodiversity-Positive Subsidies	Farmers practicing biodiversity-friendly agriculture	Incentivise adoption of sustainable practices	Lowers cost of conservation alternatives, enhances biodiversity outcomes
Environmental Fees / Levies	Resource extractors (timber, mining)	Internalise environmental costs	Reduces over-exploitation by increasing cost of harmful activities
Biodiversity Credits (Market-Linked)	Local conservation actors & private investors	Generate tradable conservation outcomes	Connects conservation performance to finance flows
Tax Incentives for Sustainable Enterprises	Small rural businesses	Encourages eco-enterprise formation	Supports livelihood diversification, reduces pressure on natural resources

Source: Author's calculation based on various literatures

Economic Framework on Biodiversity Conservation

The concept of biodiversity conservation in the rural areas cannot be interpreted without a sound economic framework explaining how different economic elements influence the decisions made by the individual, community and policy-making. There has been a growing focus among economists and environmental policymakers that economic incentives, market mechanisms and institutional arrangements each play a central role in determining biodiversity outcomes; they interact to our knowledge to either promote conservation or abstinence to alternative land use activities (Organisation for Economic Co-operation and Development [OECD], 2025) [8]. Subsections emanating below give a systematic description of the major economic aspects involved in conservation of rural biodiversity.

1. The role of Rural Livelihoods in Conservation Decisions

Natural capital including forests, water bodies, soil, and biodiversity resources that support agricultural production, non-timber forest products, and ecosystem services are foundations of rural livelihood. Since biodiversity provides direct and indirect economic advantages, its protection is

both an ethical and socio-economic goal. Agricultural land expansion is a leading cause of habitat destruction and biodiversity loss in rural areas due to subsistence and market-based farming. Rural households face trade-offs between short-term earnings from increased land use and long-term ecosystem service gains.

Financial rewards for conservation projects typically underpriced in markets are the solution, conceived as Payments for Ecosystem Services (PES) or biodiversity-positive subsidies (OECD, 2025) [7]. Payments to landholders under PES schemes maintain lands under management that improves ecological services delivery like limiting deforestation or preserving wildlife habitat. PES aligns rural livelihoods with biodiversity protection through direct economic incentives to conserve. The diversified income from alternative livelihoods like ecotourism, sustainable wildlife business, and community-based natural resource management provides income that reduces reliance on unsustainable biodiversity extraction (World Bank, 2025) [14]. This livelihood diversification helps cushion rural families against economic shocks and incentivizes habitat conservation, enhancing economic sustainability in biodiversity-rich landscapes.

2. Cost-Benefit outlook on Biodiversity conservation

Economically, conservation choices are often evaluated through cost-benefit analysis, weighing conservation costs against likely benefits. The costs include forgone agricultural income, opportunity costs of preserved land, and initial investments for biodiversity-friendly practices. Ecosystem services like water purification, climate regulation, soil fertility, pollination and cultural values related to biodiversity constitute benefits, though often diffuse and immeasurable. Underinvestment in conservation stems from market failures, including inadequate valuation of ecosystem services. Since ecosystem services are public goods, neither excludable nor rivals, private actors lack incentives to preserve them when unable to capture all benefits.

This creates a gap between social welfare and private incentives, perpetuating biodiversity loss. Economic instruments like taxes, subsidies and direct payments internalize these externalities to ensure social costs and benefits are reflected in private actors' decisions. Examples of biodiversity-friendly subsidies include tax incentives for eco-friendly farming and habitat restoration grants, reducing conservation costs for rural stakeholders. These incentives enhance the net benefits of biodiversity-maintaining activities, making them more competitive against destructive land use by altering the cost-benefit equation to favour conservation (OECD, 2025).

3. Biodiversity Loss and market forces

Market forces have direct impacts on biodiversity in terms of prices, demand and value chains that define the utilisation of land and resources. International markets have been linked to conservation outcomes in local hotspots of biodiversity through global demand of agricultural products, timber, meat, palm oil, and soy, thus demonstrating the influence of international markets on local conservation. As an illustration, the consumption patterns in rich nations can motivate the conversion of land in low-income rural areas since the producers are being encouraged to exploit land to export their goods at the cost of the biodiversity ecosystems. Incentives are also determined by prices of natural resources and their absence. With resource exploitation not being suitably charged or the cost of using natural resources being zero or low, there will be little disincentive to rural economic players to conserve. In this case, the relative

profitability of unsustainable processes may be higher than that of conservation actions and thus will lead to a rapid decrease in biodiversity. Market imperfections thus support ecological degradation, unless it is counteracted by conscious policy actions.

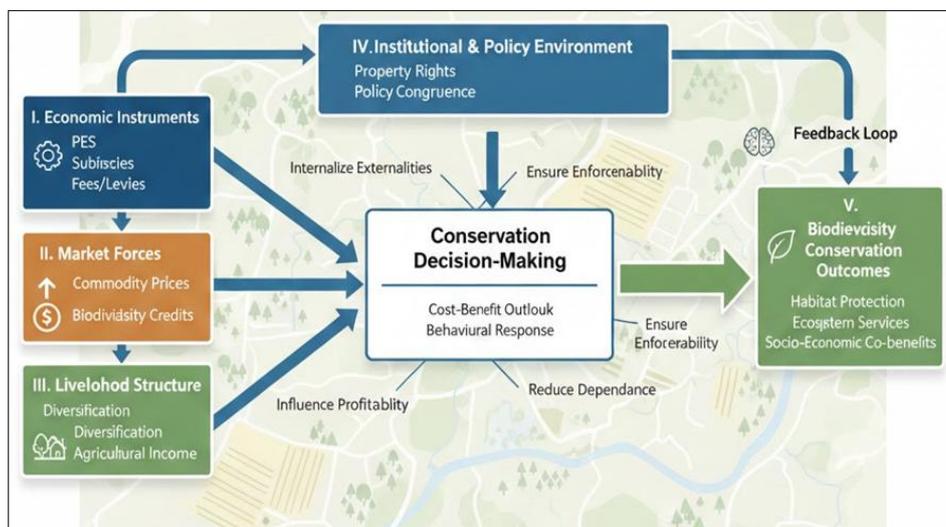
Overall, alternative financing instruments such as biodiversity credits, which are similar to carbon credits except that they are meant to fund conservation of biodiversity locally have become popular in various regions. These instruments are still in their infancy but are based on the idea of monetising the stewardship of biodiversity, and performance-based payments can be made to local communities in terms of quantifiable conservation results (Reuters, 2025)^[9]. Well-managed and fair such mechanisms can help connect global finance to the conservation on the ground in the rural landscapes.

4. Economic Institutional and Policy

The ways in which economic instruments are designed, implemented and enforced are determined by institutional frameworks and policy environments. Governments are important in ensuring that there are a set of incentives coordinated by legal frameworks, fiscal policies and through regulation. Activities of the conservation programmes can have far-reaching impacts on the rural involvement and adherence through well-constructed policies that can influence land tenure security, access to credit and benefits distribution.

Economic instruments can only work effectively when there is legalization of PES schemes, property rights and enforcement and monitoring of contractual agreements. Even goodwill incentives cannot be converted into any significant conservation results without having the institutional capacity. On the same note, institutions that do not embrace biodiversity in sectoral planning or institutions that prefer short-term economic gains to the ecological sustainability propagate incentives towards degradation.

International cooperation and international finance also affect national and local policies by offering frameworks and funding of biodiversity-positive action in global biodiversity targets. Coordinating national economic efforts with international conservation obligations can support the mainstreaming of biodiversity concerns in the rural development planning and macroeconomic decision making.



(Obtained with permission from <https://link.springer.com/article/10.1007/s11943-025-00362-8>)

Fig 1: Conceptual Model of Economic Determinants and Biodiversity Conservation Outcomes

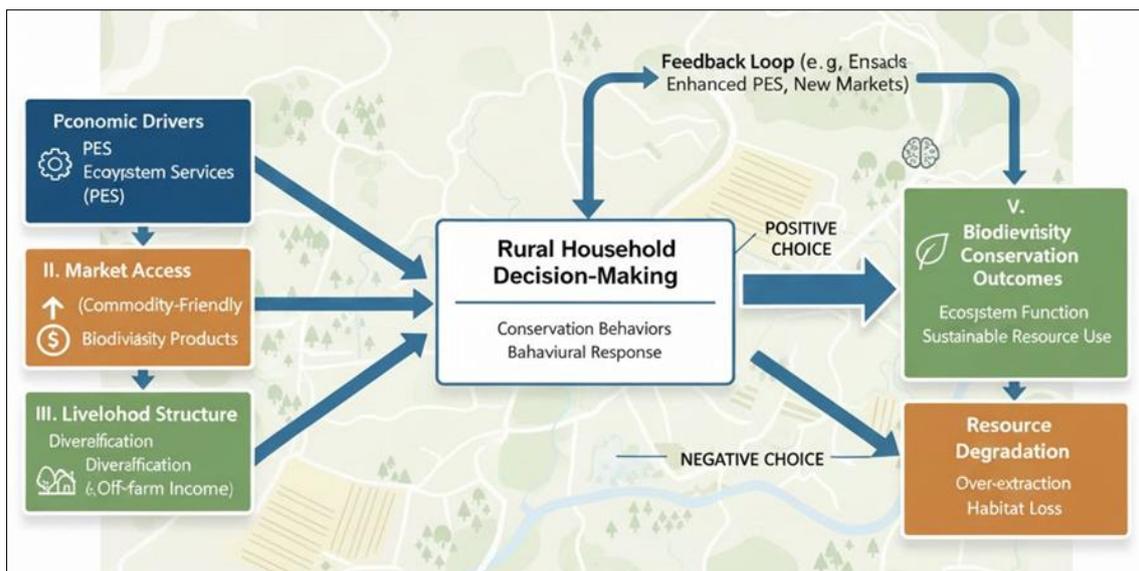
Results and Discussion

This section is a synthesis of the major findings of the economic framework and the secondary data analysed in the previous sections addressing the impact of economic incentives, livelihood structure, and market forces on the outcome of biodiversity conservation in rural areas. Findings are made in thematic form with reference to Figure 2 and Table 2 that provide summaries of evidence on the effectiveness of incentives and comparative policy outcomes.

1. Economical Analysis of major economic factors

As it was analysed, market incentives and diversifying livelihoods are in the core of influencing the outcomes of

conserving biodiversity. The OECD notes that biodiversity positive tools like Payments for Ecosystem Services (PES), biodiversity friendly subsidies, and even regulatory fees are essential in addressing market failures where ecosystem services are undervalued in regular markets (OECD, 2025). The purpose of these instruments is to bring the externalities of biodiversity inside the boundaries of the individual economic decision-making, to harmonise individual economic choices with the collective ecological worth. Indicatively, PES can pay landholders in rural areas not to increase their agricultural activities or extract other resources, as that would decrease their short-term earnings (OECD, 2025).



Source: <https://link.springer.com/article/10.1007/s11943-025-00362-8>

Fig 2: Economic Drivers and Rural Household Conservation Decisions

Figure 2 shows the effect of various economic drivers, such as PES, subsidies, and access to products environment-friendly (biodiversity) on the conservation behaviour of rural households. Good positive drivers enhance the willingness of households to conserve the environment; negative or no incentives are associated with the further use of activities that degrade biodiversity.

It empirically indicates that alternative livelihoods like ecotourism, agroforestry and sustainable forest enterprises lessen the strain on the natural resources through the diversification of income. Agroforestry PES schemes linked to agroforestry adoption have been shown to have an empirical relationship with adoption of sustainable land use practices, benefiting economic and ecological goals (Mayr, 2025) [6]. On the other hand, in situations where economic choices are constrained, the rural families might give more priority to subsistence and the market opportunities in the short run than conservation. The trend is particularly pronounced in the areas where the agricultural commodity markets contribute to land conversion, which portrays the conflict between the short time economic benefit and the ecological sustainability.

In general, economic incentives have the potential to impact conservation but they will not work everywhere. Implementation of incentive mechanisms requires the design of the program, sufficient funding and institutional support to ensure the programs are translated into quantifiable benefits of the biodiversity (OECD, 2025) [7].

2. Economic Incentives and Success in Conservation

EES, alongside various payment systems, show both positive and negative outcomes in terms of conservation and social-economic outcomes. Based on the synthesis of biodiversity-positive incentives of the OECD it is observed that properly designed PES schemes can incentivize practices that do not only maintain ecosystem service provision but also minimise the presence of harmful subsidies that can influence land use choices towards biodiversity degradation (OECD, 2025) [7]. Conservation outcomes are enhanced with the threat-based and ecosystem service provision as spatial targeting of payments, which contributes to the significance of results-based design features.

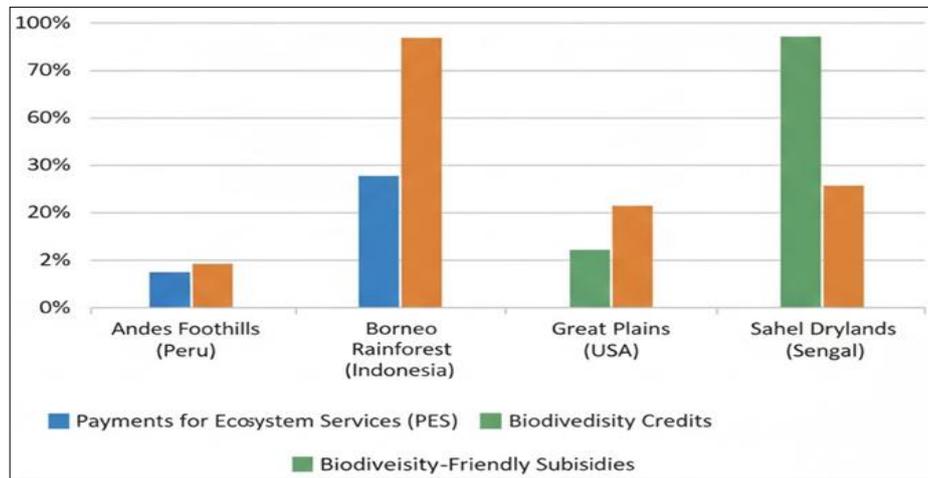


Fig 3: Trends in Adoption of Biodiversity Incentives Across Rural Regions

Table 1: Comparative Outcomes of PES and Biodiversity Credit Schemes

Scheme / Region	Ecological Outcome	Socio-Economic Outcome	Key Success Factors	Challenges Identified
PES – Agroforestry (Region A)	Reduced deforestation rates	Increased household income	Targeted payment design, monitoring	Funding limitations
PES – Forest Works (Region B)	Improved habitat connectivity	Enhanced local cash flow	Strong community engagement	Administrative complexity
Biodiversity Credits (Region C)	New protected habitat areas	Access to global finance	Private sector participation	Regulatory uncertainty
PES – Watershed (Region D)	Better water quality	Limited income diversification	Clear conditionality	Equity issues among households

Source: Author’s calculation based on various literatures

Table 2 summarises the results of comparative PES implementations in rural settings with a few highlighting that numerous schemes have helped to prevent habitat loss and encourage conservation; however, the level of socio-economic

benefits to rural households is highly variable. PES raised total household income and created a buffer to market volatility in the agricultural sector in some instances, but effects on non-agricultural income and livelihood diversification were less uniform.

Table 3: Livelihood Diversification and Conservation Indicators

Livelihood Strategy	Primary Economic Activity	Associated Conservation Indicator	Observed Effect on Resource Use
Ecotourism	Tourism services based on natural assets	Visitor satisfaction, protected area visitation	Reduced extraction pressure; more habitat protection
Agroforestry	Mixed tree + crop production	Soil fertility, tree cover	Slowed land conversion; enhanced biodiversity
Sustainable Forest Enterprises	Non-timber forest product value chains	Species diversity, product volumes	Diversifies income; reduces reliance on clearing
Off-Farm Employment	Wages from non-agricultural work	Reduced subsistence pressure	Lower land use intensity; higher conservation engagement

Source: Author’s calculation based on various literatures

Such policy design characteristics as evident conditionality, equal benefit distribution, and stakeholder participation promote the chances of success. On the other hand, lack of administrative complexity, inadequacy of financial means and poor enforcement diminish programme effectiveness. Similar instruments are the evidence of conservation finance based on a market, which suggests that market-based conservation funding can mobilize more resources and connect rural biodiversity results with the global finance flows when managed to engage the private sector (Wunder, 2025) [15].

These conclusions indicate that economic incentives are important elements of a comprehensive conservation strategy, although they have to be integrated into a logical

policy framework with regulatory protection and livelihood support systems to optimise ecological and socio-economic co-benefits (OECD, 2025) [8]. This combined solution contributes to the environmental efficiency and equity of incentive-based conservation.

3. Comparative Discussion on the Existing Studies

The comparison with evidence supports the wider literature that economic incentives do not work as panacea, but can play a positive role under the conditions that are enabling in bringing the positive conservation impacts. OECD focuses on the idea that biodiversity incentives should be included in consistent policy combinations that feature regulatory policies, information tools and cross-sectoral alignment to

achieve co-benefits instead of maladaptive results (OECD, 2025).

The empirical research on the application of PES to agroforestry adoption also supports the idea that empirical foundations can be used to alter the land use process towards the better benefit of biodiversity management when rural actors see economic gains directly (Mayr, 2025) [6]. There are also the instruments of biodiversity financing like the biodiversity credits which have a potential to increase the sources of finance and to connect up rural conservation with international financial flows, filling in the funding gap so limiting many rural ecosystems.

A combination of these stories suggests that customized incentive systems when combined with regulatory and informational instruments has better chances of achieving the rural economic development and biodiversity conservation objectives than single incentive programs.

4. Policy implications on Rural Development

The results highlight the importance of the policy congruence between economic incentives and more comprehensive rural development policies. Some of the policies should focus on diversification of livelihoods, incentive design to meet the needs of rural areas and capacity building of institutions to enable an effective rural participation in conservation programmes. The economic valuation of land use planning and development budgets will assist in aligning the national economic policies with the global biodiversity objectives, making sure that the rural conservation benefits are identified and incentivised in the technological economies.

The writer has asserted that freedom of speech is a human right that must be respected by individuals irrespective of whether the freedom is restricted or not. The author has stated that freedom of speech is a human right that should be honoured by people regardless of whether the freedom is limited or not.

Table 4: Policy Instruments and Implementation Challenges

Policy Instrument	Expected Benefit	Implementation Challenge	Mitigation Strategy
Targeted PES Programs	Aligns landholder incentives with conservation outcomes	High administrative cost	Leverage digital monitoring tools
Biodiversity-Friendly Subsidies	Encourages sustainable agriculture	Budgetary constraints	Reallocate harmful subsidies
Environmental Fees / Levies	Discourages harmful extraction	Resistance from stakeholders	Phased implementation with consultation
Biodiversity Credits	Mobilises new finance sources	Regulatory fragmentation	Develop clear standards and certification
Institutional Capacity Building	Improves governance & enforcement	Limited trained staff	Integrate training into rural development programs

Source: Author’s calculation based on various literatures

The writer has asserted that freedom of speech is a human right that must be respected by individuals irrespective of whether the freedom is restricted or not. The author has stated that freedom of speech is a human right that should be honoured by people regardless of whether the freedom is limited or not.

Policy Recommendations

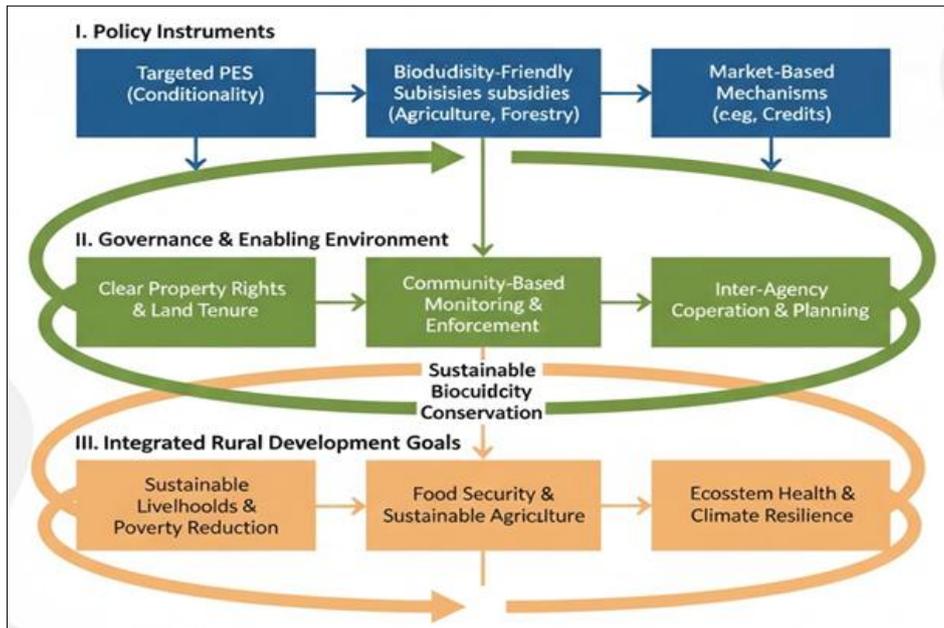
In order to balance rural economic development and biodiversity conservation, policymakers have to come up with multifaceted and context-oriented economic policies that are not limited to single tools but include policy combinations. First, a greater number and intensity of biodiversity-beneficial programs like Payments for Ecosystem Services (PES), biodiversity-compatible subsidies and environmental fee regimes can be established to coordinate individual land-use behavior with the ecological interests of society. These instruments must be spatially directed to the hotspots of biodiversity, distinguish the level of payment according to costs of opportunity, and put more emphasis on results-based and hybrid payment system to enhance cost-efficiency (Organisation for Economic Co-operation and Development [OECD], 2025) [8].

Second, governments at the national and sub-national levels

must convert destructive subsidies, which unintentionally stimulate the destruction of biodiversity, e.g. those that facilitate land conversion or monoculture into positive incentives that encourage sustainable actions. This redistribution of government spending would expand the fiscal space of conservation, not augment the general spending.

Third, the rural development policy should incorporate livelihood diversification programs such as ecotourism, agroforestry and the development of small-holder enterprises that establish economic alternatives to economic activities that damage the biodiversity. Incorporating the concerns of the environment into the rural economic planning are in line with the targets of the Sustainable Development Goals that mandate more biodiversity financing and integration of ecosystem values in national planning systems.

Finally, the issues of implementing it effectively require institutional capacity building, the inclusion of all stakeholders, and monitoring mechanisms that guarantee transparency, equitable distribution of benefits, and adaptive governance in various sectors. They can facilitate the design and evaluation of socially equitable and ecologically effective incentive mixes with the assistance of multi-stakeholder platforms (OECD, 2025).



Source: <https://link.springer.com/article/10.1007/s11943-025-00362-8>

Fig 4: Framework for Policy Integration of Economic Incentives and Rural Development Goals

Conclusion

This research has shown that the key determinants of the results of conservation of biodiversity in rural areas are the economic factors. Economic instruments like Payments for Ecosystem Services (PES), biodiversity-friendly subsidies, and market mechanisms have the potential to realign the decision-making of private land-user with the environmental ecological value in order to diminish pressures on biodiversity-friendly landscapes (Organisation for Economic Co-operation and Development [OECD], 2025) [8]. It has been shown that these instruments can enhance conservation behaviours among rural households when designed well and sufficiently financed and combined with livelihood diversification policies (OECD, 2025; Mayr, 2025) [6].

Economic instruments do not exist in isolation, as much as they have potentials, their effective implementation requires institutional capacity, fair distribution of benefits, and integration to the overall rural development planning. This multi-layered approach to policy is suggested by the complicated interaction between market forces, incentives and livelihood structures and is likely to lead to sustainable biodiversity outcomes. Any conservation efforts that overlook the economic motivation tend to continue to convert land and degrade the ecosystem.

Lastly, both the economic development of the rural regions and the conservation of biodiversity demands an integrated system of policies that incorporate economic incentives into the institutional and socio-economic policy frameworks to build robust rural economies and flourishing ecosystems in the same (OECD, 2025; Reuters, 2025) [9].

Acknowledgements

Authors wholeheartedly extend their heartiest gratitude towards the administration of Seth Anandram Jaipuria College for the generous support with their encouragement leading to the successful completion of this project.

References

1. Aziz S. Harmony with nature: Integrating biodiversity preservation into rural economic growth (Unpublished

- manuscript), 2024. Retrieved from https://www.researchgate.net/publication/386392354_Harmony_with_Nature_Integrating_Biodiversity_Preservation_into_Rural_Economic_Growth
2. Batpurev K. Lessons learned for payment for ecosystem services schemes. *BioScience*, 2025;75(12):1101. <https://doi.org/10.1093/biosci/biae121>
3. Dasgupta P. Economic factors underlying biodiversity loss. *Philosophical Transactions of the Royal Society B*, 2023. <https://doi.org/10.1098/rstb.2022.0197>
4. Le TAT, *et al.* Benefits and risks of ecosystem services payments globally. *Frontiers in Environmental Science*, 2024. <https://doi.org/10.3389/fenvs.2024.1419821>
5. Ma L, Hong L, Liang X. Integrating ecological and economic approaches for ecosystem services and biodiversity conservation: Challenges and opportunities. *Ecologies*, 2025;6(4):70. <https://doi.org/10.3390/ecologies6040070>
6. Mayr S. Scaling agroforestry through payments for ecosystem services: Evidence from rural PES adoption. *Journal of Environmental Policy & Planning*, 2025. <https://doi.org/10.1080/14693062.2025.2490205>
7. Ngongolo K, Kyando M. Biodiversity conservation and socio-economic development for Africa's harmonious future: A scoping review. *BMC Environmental Science*, 2025, 2(11). <https://doi.org/10.1186/s44329-025-00021-x>
8. Organisation for Economic Co-operation and Development. Scaling up biodiversity-positive incentives: Biodiversity-positive subsidies and payments for ecosystem services, 2025. Retrieved from https://www.oecd.org/en/publications/scaling-up-biodiversity-positive-incentives_19b859ce-en.html
9. Reuters. Can Africa use biodiversity credits to turn its rich carbon stores into hard cash? 2025, (January 2). Retrieved from <https://www.reuters.com/sustainability/land-use-biodiversity/can-africa-use-biodiversity-credits-turn-its-rich-carbon-stores-into-hard-cash-2025-01-02/>

10. Sustainable Development Goal 15. Life on land. Wikipedia., n.d. Retrieved from https://en.wikipedia.org/wiki/Sustainable_Development_Goal_15
11. Times of India. Mula–Mutha’s ecosystem in Pune worth ₹5,000 crore a year: Study, 2025, (December 12). Retrieved from <https://timesofindia.indiatimes.com/city/pune/mulamut-has-ecosystem-in-pune-worth-5k-cr-a-year-study/articleshow/125920506.cms>
12. Van Leenders C, Heijblom P. Strategies to scale up payments for ecosystem services. Inter-American Development Bank, 2024, 1–27. Retrieved from <https://www.idfb-dialogue.org/wp-content/uploads/2024/09/Strategies-to-scale-up-payments-for-ecosystem-services-.pdf>
13. Wang Y, Zhang Y, Yang H, Niu J, Chen X. Effects of payments for ecosystem services and livelihoods on non-grain agricultural land use. *Forests*,2024;15(3):521. <https://doi.org/10.3390/f15030521>
14. World Bank. Biodiversity: Why it matters for development,2025. Retrieved from <https://www.worldbank.org/en/topic/biodiversity>
15. Wunder S. Biodiversity credits: An overview of the current state and potential outcomes. *Business Strategy and the Environment*, 2025. <https://doi.org/10.1002/bse.70018>