

From Ecosystem Services to Ecological Product Value: Mechanisms of Value Realization in Fujian's Coastal Wetlands

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Abstract: Coastal wetlands deliver multiple ecological functions. They hold coastal shorelines stable, store large amounts of carbon, protect local native species, clean polluted water, sustain coastal fisheries, and support cultural and tourism activities in coastal zones. Most of these ecological benefits cannot enter open markets. People fail to reflect their economic value through market transactions, so local residents and wetland conservation workers gain no stable economic rewards from wetland protection. This paper chooses Fujian coastal wetlands as the research subject. It studies effective methods to convert wetland ecosystem services into marketable ecological products. The whole process relies on institutional recognition, ecological asset accounting, market connection, industrial improvement and fair benefit sharing. This research sets up a complete conceptual framework with four connected modules. The framework identifies wetland ecosystem services, creates practical ecological products, realizes product monetization, and establishes supporting governance systems. This research confirms two basic conditions for wetland ecological value conversion. Wetland ecosystems require stable natural resource bases. Meanwhile, value transformation needs clear property rights, complete ecological compensation policies, mature green financial systems, standard ecotourism management, functional blue carbon trading systems and public participation. This paper concludes practical methods to turn ecological strengths into sustainable development benefits. It also enriches the research scope of ecosystem service assessment and ecological civilization construction.

Keywords: Ecosystem Services; Ecological Product Value; Coastal Wetlands; Fujian

Province; Ecological Civilization; Value Realization Mechanism

1. Introduction

Coastal wetlands belong to the key natural ecosystems on Earth. They bring obvious ecological benefits to nature and human society. Wetlands supply breeding and living spaces for different wild species. They remove pollutants from coastal water and surface runoff, cut flood risks, store carbon and relieve local climate problems. Beyond ecological protection, wetlands sustain local fisheries, boost coastal tourism and leisure business, and hold special cultural value for coastal residents. For coastal areas such as Fujian Province, wetlands link with marine economic growth, fishery production, tourism development, biodiversity protection and local climate adaptation [1].

People overlook and underrate the true economic value of coastal wetland ecosystems, even with their important functions. Most wetland ecological services belong to public environmental resources and never enter regular market sales and transactions. People struggle to quantify these values and turn ecological gains into measurable economic returns. This creates a real practical dilemma. Coastal wetlands create massive ecological and social benefits for society, yet these benefits rarely translate into tangible economic gains or effective incentive support. Local governments, enterprises, communities and residents therefore lack direct economic motivation to protect and manage wetland resources. If people cannot measure, trade, compensate and share wetland ecological value properly, wetland protection will face threats from land reclamation, industrial expansion, overdeveloped aquaculture and excessive tourism exploitation.

The concept of ecological product value realization provides a possible solution to this contradiction [2]. Ecological products refer to

ecological goods and services that satisfy people's needs for a better environment, sustainable resources, and ecological well-being. Value realization means transforming ecological resources and ecosystem services into economic, social, and governance value through institutional arrangements, market mechanisms, public compensation, industrial integration, and community participation.

Fujian Province provides a meaningful setting for this study. As a coastal province with rich wetland resources and strong marine economic activities, Fujian faces the dual task of ecological protection and coastal development. Its coastal wetlands have the potential to support biodiversity conservation, blue carbon development, eco-tourism, green aquaculture, environmental education, and coastal resilience. Therefore, exploring the value realization mechanism of Fujian's coastal wetland ecological products is important for both ecological civilization construction and high-quality coastal development.

This study aims to answer three questions:

- What types of ecosystem services are provided by Fujian's coastal wetlands?
- How can these ecosystem services be transformed into ecological product value?
- What institutional, market, industrial, and community mechanisms are needed to realize and sustain such value?

This study delivers several notable contributions to existing literature. It bridges international ecosystem service theories with localized ecological product value policies in China. It also establishes a targeted mechanism framework for wetland value transformation. Furthermore, this research offers practical policy references for wetland governance, ecological industrial development and regional ecological compensation systems in Fujian.

2. Literature Review

2.1 Ecosystem Services and Coastal Wetlands

Ecosystem services include all benefits that nature provides for human societies. Researchers classify these benefits into four major categories: provisioning services, regulating services, cultural services and supporting services. For coastal wetlands, provisioning services contain fishery products, aquaculture resources, reeds and other biological materials. Regulating services include carbon storage, shoreline

protection, water cleaning, flood control and climate adjustment [3,4].

Wetland systems offer basic environmental support for coastal regions and provide rich cultural resources. Special wetland landscapes promote coastal tourism and outdoor leisure activities. Wetland areas also serve as good places for environmental education. They preserve local ecological traditions inherited by coastal residents. Wetlands maintain regional biodiversity, support nutrient cycling in food chains, and create stable habitats for aquatic and terrestrial creatures.

Coastal wetlands have different features from land ecosystems. They interact with oceans, rivers and human living areas. As a natural buffer between land and sea, these ecosystems reduce coastal disaster risks and keep regional ecological systems stable.

All wetland ecological services belong to public resources. Traditional markets do not trade these resources. People ignore their economic value, and standard economic statistics do not record their value. This situation causes an obvious imbalance. Coastal wetlands create large ecological and social benefits for the public, but these benefits do not bring economic returns for wetland protection.

2.2 From Ecosystem Service Valuation to Ecological Product Value

Ecosystem service valuation is a practical analysis tool. It sorts out ecological benefits and turns these benefits into measurable economic data. Common assessment methods include market value calculation, replacement cost estimation, damage cost avoidance, travel cost models, contingent valuation and benefit transfer [5]. These methods turn abstract ecological value into clear data. Policy makers and managers use such data to make economic plans and administrative decisions.

Simple ecological value calculation cannot create real economic benefits. Assessment results show high wetland ecological value, but these data have no practical use without complete institutional support. Value conversion needs stable payment rules, mature trading platforms, targeted ecological compensation policies and feasible industrial development paths [6,7].

Value calculation alone cannot realize wetland ecological value. The research focuses on practical methods. These methods turn hidden

ecological strengths into steady economic profits, improved social welfare, available ecological capital, active governance awareness and long-term sustainable development abilities. Value realization follows three clear stages in actual operation. First, researchers identify and quantify all ecosystem services provided by coastal wetlands. Second, practitioners convert these ecological services into tradable ecological products. Third, stakeholders complete value conversion through market transactions, policy support, industrial development and public participation.

2.3 Ecological Civilization and Ecological Product Value Realization

The development of ecological civilization has changed the traditional understanding of ecological resources. Instead of merely viewing ecological resources as something that needs passive protection, we now recognize that they can deliver sustainable value. Clean water, lush mountains, wetlands, forests, coastal shorelines and rich biodiversity can all create long-term social and economic benefits, as long as we build sound institutional and operational mechanisms [8,9].

When it comes to coastal wetlands, realizing the value of ecological products relies on striking a balance between ecological protection and economic development. Over-commercial development will destroy the integrity of wetland ecosystems, while absolute protection that ignores development needs will reduce local

enthusiasm for wetland conservation. For this reason, a sustainable operational mechanism is required, which integrates ecological protection, economic upgrading, public ecological compensation, community engagement and long-term standardized governance.

2.4 Research Gap

Current academic research has conducted in-depth and extensive studies on the evaluation of wetland ecosystem services and wetland conservation strategies. Nevertheless, there are still three obvious research deficiencies that need to be filled.

Current scholarship tends to prioritize quantitative ecological evaluation while neglecting institutional and market-based value transformation pathways. Many studies also treat ecological resources as generic environmental assets without examining the unique functional characteristics of coastal wetlands. In addition, comprehensive theoretical systems that integrate service assessment, product transformation, value realization and governance mechanisms remain insufficient in existing research.

This study addresses the existing research gaps and builds a full mechanism framework for the coastal wetlands of Fujian Province based on their natural features.

3. Research Framework and Methodology

3.1 Research Framework

Table 1. Ecosystem Services and Potential Ecological Products in Fujian's Coastal Wetlands

Ecosystem service type	Specific wetland service	Possible ecological product
Provisioning service	Fisheries, aquaculture resources, biological products	Green seafood, ecological aquaculture products
Regulating service	Carbon sequestration, shoreline protection, water purification	Blue carbon product, coastal resilience service
Cultural service	Landscape, recreation, birdwatching, local culture	Eco-tourism, wetland education, research tourism
Supporting service	Biodiversity, habitat provision, nutrient cycling	Biodiversity conservation product
Integrated service	Wetland landscape and ecological identity	Regional ecological brand

This analysis adopts a structural framework with four core steps. The research first sorts out and defines all ecological services supplied by coastal wetlands. It then turns intangible ecological services into standard ecological products that fit market demands. These products cover blue carbon commodities, ecotourism projects, sustainable aquaculture products, environmental education services, biodiversity conservation services and coastal disaster prevention services [10].

The third step creates feasible paths to realize monetary value from these ecological products. The research develops multiple channels for value conversion, including market trading, government ecological compensation, financial innovation, cross-industry integration and regional ecological brand cultivation. The fourth step establishes full governance guarantee measures to sustain the operation of the entire value realization system. These measures include wetland property right confirmation,

dynamic ecological monitoring, equitable benefit distribution, rigid ecological red-line management and extensive community participation. Table 1 shows the internal logic of this research framework.

3.2 Case Context: Fujian's Coastal Wetlands

Fujian's coastal wetlands lie at the core of marine economic development, ecological protection, fishery production, port construction and coastal tourism. These wetland ecosystems generate abundant ecological benefits. They shelter wild animals, guard coastal shorelines, store carbon naturally, and form unique natural and cultural scenery in coastal zones.

Fujian's wetlands still face obvious development pressures. Urban expansion, aquaculture development, large coastal infrastructure construction and growing tourist activity all pose risks to these vulnerable ecosystems. Fujian owns superior ecological resources and faces prominent development conflicts, which makes it a typical and suitable research case. The region serves as a valid trial area to explore ways to develop ecological product value and protect wetland ecological integrity at the same time.

3.3 Analytical Method

This study adopts a conceptual mechanism analysis approach based on case study logic. The analytical procedures of this study consist of three core stages, including the classification of wetland ecosystem services, the matching of ecological product forms, and the comprehensive analysis of multi-dimensional value realization mechanisms.

This research mainly focuses on framework construction and mechanism analysis. For future in-depth empirical research, researchers can adopt questionnaires, expert scoring, quantitative ecosystem service evaluation, comparative case analysis or fsQCA methods to verify and optimize the theoretical framework proposed in this paper.

4. Mechanisms of Ecological Product Value Realization

4.1 Value Identification Mechanism

Accurate recognition and assessment of ecological value lays a solid foundation for subsequent value transformation practices. Before wetland ecological value can be turned into tangible gains, stakeholders must complete

full resource surveys, clear classification and scientific assessment. This work includes mapping wetland spatial distribution, measuring ecosystem service capacity, building ecological asset accounts, and screening which environmental services can be developed into marketable products or public ecological services.

Wetland ecological functions turn into real value through a set of practical approaches. Researchers assess carbon storage capacity with standard blue carbon accounting rules, and bring carbon sink benefits into market trading. Local natural landscapes and wildlife resources support ecotourism growth. Wetland water purification and coastal protection functions match government ecological compensation policies and public ecological service systems.

Undefined and unmeasured wetland ecological value makes wetland conservation a pure financial burden. Decision makers ignore the attribute of wetlands as valuable ecological assets that create long-term benefits. Full value identification serves as the basic premise to turn wetland ecological advantages into tangible economic results.

4.2 Institutional Recognition Mechanism

Formal institutional systems standardize and legalize the transformation of ecological product value. Ecological functions and services cannot turn into marketable ecological products without institutional definition, official certification and standardized supervision. Sound institutional rules and standardized management enable formal value conversion of ecological resources. This work requires clear rules for resource ownership, use rights, conservation obligations, compensation criteria and profit distribution plans.

Vague property rights and fragmented departmental management hinder the ecological value realization of Fujian coastal wetlands. Local governments need to sort out the duties of ecology, natural resources, marine, agriculture, tourism and financial departments. Wetland ecological value covers multiple industries and administrative fields, so cross-departmental collaborative governance forms a necessary foundation for value transformation.

4.3 Market Transformation Mechanism

Market-oriented operation mechanisms offer effective channels to translate ecological

advantages into tangible economic returns. Many wetland-based ecological products can directly or indirectly connect with the market. Typical examples include ecological tourism, bird-watching experiences, nature education courses, certified eco-friendly aquaculture and green agricultural products, all of which can generate stable market income. In addition, blue carbon trading and ecological compensation policies can build quasi-market channels to realize ecological value with policy support.

That said, market development must be properly regulated. Excessive commercialization will lead to overdevelopment, such as unchecked tourism expansion, excessive construction and blind resource exploitation, which will damage wetland ecosystems. For this reason, all market conversion activities must adhere to the principle of ecological protection first.

4.4 Industrial Integration Mechanism

Integrating wetland ecological resources with diverse green industries significantly improves the efficiency of ecological value utilization. Simply relying on single ecological services cannot release the full potential of wetland resources. Integrating wetland ecology with related industries — including eco-tourism, green aquaculture, environmental education, cultural and creative industries, scientific research services and coastal rural revitalization — can greatly improve the efficiency of ecological value transformation.

For Fujian's coastal wetlands, feasible industrial paths include developing characteristic wetland tourism routes, building coastal environmental education bases, creating high-quality green seafood brands, launching blue carbon demonstration projects, and designing wetland-themed cultural and creative products. Such industrial integration helps convert static ecological resources into diverse and sustainable economic income.

4.5 Benefit-Sharing Mechanism

Sustainable wetland protection relies heavily on fair benefit-sharing mechanisms that fully motivate local stakeholders. Local communities and residents are the primary groups affected by wetland protection initiatives, acting as key stakeholders in this process. When local residents take on the responsibilities and economic costs of wetland preservation, yet gain no access to the ecological rewards and

economic profits brought by these ecosystems, they will gradually lose the initiative and motivation to participate in protective work actively.

Thus, the realization of ecological product value must benefit local residents concretely, through ways such as providing local jobs, developing community-led tourism, supporting cooperative aquaculture operations, distributing ecological compensation funds, and upgrading local public services. A fair and reasonable benefit-sharing system can transform local residents from passive managers into active participants and protectors of wetland ecosystems. Table 2 summarizes the detailed composition of all five value realization mechanisms mentioned above.

Table 2. Mechanisms of Value Realization

Mechanism	Core function
Value identification	Make ecological value visible
Institutional recognition	Turn ecological resources into governable assets
Market transformation	Convert ecological value into revenue
Industrial integration	Link wetlands with green industries
Benefit sharing	Improve stakeholder incentives

5. Discussion

5.1 Theoretical Implications

This research bridges two major academic areas: ecosystem service theory and research on ecological product value realization. Traditional ecosystem service theory outlines all environmental benefits brought by coastal wetlands. This study moves one step further, exploring practical ways to turn these theoretical ecological benefits into real economic and social value.

This study enriches current research on wetland governance. Most previous studies focus on passive wetland protection. This study changes the research focus to active development and utilization of wetland ecological value. Coastal wetlands are not only areas for strict protection. With scientific planning and standard management systems, wetland resources can turn into valuable ecological assets and support long-term sustainable development of coastal areas.

5.2 Practical Implications for Fujian

Fujian can unlock the economic value of coastal wetland resources by adopting policy measures

that fit local regional conditions.

First, local governments can establish a complete ecological asset accounting system for all coastal wetlands. The system helps staff measure core wetland functions, including carbon storage, biodiversity protection, water purification and coastal disaster prevention.

Fujian can develop wetland ecotourism and environmental education programs on the premise of ecological safety. Management teams need to cap tourist numbers and control infrastructure construction. These actions stop overdevelopment and prevent permanent damage to wetland ecosystems.

Optimize ecological aquaculture modes and create local green seafood brands. These moves

improve the market competitiveness of eco-friendly fishery products. They create more economic benefits for local industries and support steady and healthy industrial development.

Local governments can launch blue carbon pilot projects. All carbon development and trading activities require on-site ecological supervision and unified carbon accounting standards. These standard rules guarantee valid and reliable blue carbon data.

Wetland management needs public participation and fair benefit distribution rules to maintain long-term ecological stability. Table 3 presents detailed policy plans and implementation paths for the above improvement measures.

Table 3. Policy Pathways for Fujian's Coastal Wetland Ecological Product Value Realization

Policy pathway	Main action	Risk to avoid
Ecological asset accounting	Build wetland ecosystem service accounts	Overvaluation without monitoring
Eco-tourism development	Create controlled wetland tourism and education products	Over-commercialization
Green aquaculture branding	Certify ecological seafood and low-impact aquaculture	Greenwashing
Blue carbon exploration	Develop carbon accounting and pilot projects	Unverified carbon claims
Community benefit sharing	Provide jobs, compensation, and cooperative income	Excluding local residents
Digital monitoring	Use remote sensing and data platforms for wetland governance	Data without enforcement

5.3 Risks and Constraints

The transformation of wetland ecological value into economic benefits brings great development potential. This process also meets many practical risks and restrictions.

Unified standards for ecological valuation are absent in many cases. This situation makes people overestimate the real ecological value of wetlands. Market development without consideration of wetland environmental capacity causes over-exploitation and gradual ecological damage. Unfair benefit distribution also brings problems. Local residents lose access to profit sharing in wetland development projects, and people lose willingness to protect wetland resources.

Coastal wetland management involves different government departments and stakeholders. Separate management and poor cross-department cooperation lower policy efficiency and weaken implementation results. Not all wetland ecological functions can turn into cash directly. Core services including biodiversity protection and coastal disaster prevention fail to generate market income.

Ecological product value realization differs from the simple sale of natural resources. It serves as

a complete governance mode. This mode creates long-term social and economic benefits and keeps wetland ecosystem structure intact and stable.

6. Conclusion

This study explores feasible approaches to convert the ecosystem services of Fujian's coastal wetlands into viable ecological product value. The research confirms that coastal wetlands deliver diverse ecological functions, covering supply, regulation, culture and ecosystem support services. However, these inherent ecological advantages can only generate stable and sustainable value with the support of complete mechanisms, including scientific value identification, institutional confirmation, market-oriented transformation, industrial integration and reasonable benefit sharing.

This study confirms that ecological product value realization is a systematic governance project rather than a simple numerical assessment of environmental value. It is a systematic project that integrates ecological statistics and accounting, property right definition, market operation channels, industrial upgrading, ecological compensation and community co-governance. For Fujian Province,

the core development goal is to translate the ecological advantages of coastal wetlands into sustainable regional development strengths, while strictly avoiding any damage to wetland ecological structures and functions. The framework constructed in this paper can guide future empirical research on wetland ecological value. Follow-up studies can adopt field investigations, quantitative evaluations, comparative case analyses and numerical measurement methods to further optimize and improve the theoretical system proposed in this research. By adopting these diverse research methods, scholars can further improve and refine the theoretical framework and practical research system proposed in this paper.

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