

Mass For Creation and Biome 9: A Biodiversity Forum An Ecological Economics Perspective from the Nabaoy River, Philippines

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ABSTRACT

Science-faith forums are increasingly recognized as informal institutions that influence environmental governance, especially in biodiversity-rich areas where social cohesion is strong. This study examines Mass for Creation and Biome 9: A Biodiversity Forum held near Nabaoy River in Malay, Aklan, as a case of faith-based environmental engagement with economic implications for biodiversity governance. Using a qualitative institutional economics approach and the World Café methodology, this study analyzes how the integration of religious celebrations and scientific dialogue influences environmental values, social capital formation, and nonmarket valuation of ecosystem services. Outputs from four World Café groups were synthesized to assess the outcomes of the forums. Results indicate strengthened norms of stewardship, enhanced multi-sectoral collaboration, and increased recognition of the long-term value of ecosystem services. These findings suggest that science-faith forums can complement formal environmental policies by lowering transaction costs and strengthening collective action for biodiversity conservation.

Keywords: ecological economics, biodiversity forum, World Café, faith-based institutions, ecosystem services, Philippines

INTRODUCTION

River ecosystems are important natural capital, generating ecosystem services that support local and regional economies, including water regulation, food provision, climate moderation, and cultural services (Costanza et al., 1997; Daily, 1997). In the Philippines, biodiversity-rich rivers such as the Nabaoy River in Malay, Aklan play a key role in sustaining livelihoods, ecotourism, and ecological resilience.

Despite their economic importance, river systems face increasing pressures from land-use change, pollution, and unsustainable development. Conventional environmental economics often relies on regulatory and market-based instruments to address these challenges. However, such approaches may be inadequate when enforcement capacity is limited and when environmental behavior is strongly shaped by cultural and moral norms (Ostrom, 1990).

Faith-based environmental engagement has emerged as an influential but under-researched institutional mechanism in environmental governance. Religious institutions shape collective values, preferences, and

behavior, thereby influencing environmental outcomes at relatively low transaction costs (North, 1991). In ecological economics, such informal institutions are increasingly recognized for their role in sustaining long-term stewardship of natural capital (Spash, 2013).

The Mass for Creation and Biome 9: Biodiversity Forum combined religious celebration with scientific dialogue, bringing together educators, scientists, clergy, and environmental advocates. Led by Fr. Jayvee Delos Santos and co-celebrated by Fr. Kevin Roldan, Fr. Mark Lister Malsin, and Fr. Jun Alden Abella, the event served as the culminating activity for Biome 9. This study examines how the forum functions as an informal economic institution that supports biodiversity governance. 1.1 Review of Related Literature and Studies.

Ecological Economics and Ecosystem Services

Ecological economics emphasizes that economic systems are embedded in ecological systems and are therefore constrained by biophysical limits (Costanza et al., 1997; Daly, 1997). Unlike neoclassical economics, which often treats nature as an externality, ecological economics recognizes ecosystems as a form of natural capital that generates essential services such as water regulation, biodiversity maintenance, climate regulation and cultural benefits (Daily, 1997).

Costanza et al. (1997) provide a basic assessment of global ecosystem services, showing that non-market ecological functions contribute significantly to human well-being and economic stability. The ecological economics literature further argues that ignoring these values leads to policy failure, environmental degradation and long-term economic losses (Spash, 2013). In river systems, ecosystem services such as the provision of fresh water, flood control and cultural services are crucial for local livelihoods and regional development.

In the Philippine context, river ecosystems support agriculture, fisheries, ecotourism and cultural practices. However, these services are often underestimated in conventional development planning, increasing vulnerability to environmental degradation. Therefore, ecological economics requires a governance approach that integrates scientific knowledge, cultural values, and long-term sustainability considerations. 1.1.2 Institutions, Social Capital, and Environmental Governance

Institutional economics highlights the role of formal and informal institutions in shaping human behavior and economic outcomes. North (1991) defined institutions as the “rules of the game” that structure social interaction, including laws, norms, and cultural practices. In environmental governance, informal institutions—such as shared values, moral norms, and trust—can be as influential as formal regulations.

Ostrom’s (1990) work on common-pool resources demonstrated that communities can successfully manage shared natural resources through collective action, provided that trust, communication, and locally appropriate rules are present. Later studies further emphasized that social capital and institutional diversity are essential for sustainable resource management (Ostrom, 2005).

Putnam (2000) conceptualized social capital as networks, norms, and trust that facilitate cooperation for mutual benefit. In environmental contexts, high levels of social capital reduce transaction costs associated with monitoring, enforcement, and coordination. This is particularly relevant in biodiversity-rich regions where formal enforcement capacity may be limited.

Faith-Based Environmental Engagement

Faith-based institutions are increasingly recognized as influential actors in environmental governance because of their moral authority, social reach, and capacity to shape values and behavior. Religious teachings often frame environmental stewardship as an ethical obligation, reinforcing long-term responsibility for nature (Francis, 2015).

The encyclical *Laudato Si’* explicitly links ecological degradation to social injustice and economic inequality, calling for an “integral ecology” that integrates environmental protection, economic development, and moral responsibility (Francis, 2015). This perspective aligns with ecological economics, which critiques growth centered development models and emphasizes sustainability and intergenerational equity.

Empirical studies show that faith-based environmental initiatives can strengthen environmental awareness, encourage voluntary compliance, and increase community participation in conservation activities. By embedding scientific knowledge in moral and spiritual narratives, religious platforms can increase the legitimacy and acceptance of environmental messages, especially in culturally cohesive communities.

Participatory Dialogue and the World Café Method

Participatory approaches are widely used in environmental governance to facilitate inclusive dialogue, shared learning, and collective decision-making. The World Café methodology, developed by Brown and Isaacs (2005), is a structured conversational process that promotes collaborative knowledge generation through small group dialogue.

Research has shown that participatory dialogue methods increase stakeholder engagement, build trust, and support shared knowledge production. In environmental contexts, such methods help translate abstract scientific concepts into meaningful local insights and action-oriented strategies. From an institutional economics perspective, participatory dialogue contributes to the formation of norms and collective ownership, thus strengthening informal governance mechanisms.

Synthesis and Research Gap

Existing literature demonstrates the importance of ecosystem service valuation, social capital, informal institutions, and participatory governance in achieving sustainable environmental outcomes. However, limited empirical research has examined the intersection of faith-based engagement, participatory dialogue, and ecological economics, particularly in the context of riverine biodiversity in the Philippines.

This study addresses this gap by examining Mass for Creation and Biome 9: A Biodiversity Forum as faith science platforms that function as informal economic institutions. By analyzing World Café outputs and participant interactions, this study contributes to the growing literature on culturally informed approaches to biodiversity governance. 2. Methods

Research Design

This study uses a qualitative and interpretive case study design grounded in institutional and ecological economics. The Mass for Creation and Biome 9: Biodiversity Forum is conceived as a socio-institutional intervention, rather than a purely religious or educational event. This design recognizes that environmental governance outcomes are often mediated by informal institutions, such as values, norms, and social networks, which cannot be adequately captured by purely quantitative indicators (Ostrom, 2005; Spash, 2013).

The case study approach was chosen because the forum represented a limited context-specific event situated within a specific ecological system (the Nabaoy River) and cultural setting. This approach allows for an in-depth examination of how religiously based discourses and scientific knowledge interact to influence environmental assessments and collective action.

Figure 1. depicts the celebration of the Mass for Creation held along the banks of the Nabaoy River. The liturgical assembly situates the act of worship within the river landscape, symbolically affirming the interconnectedness of religion, biodiversity, and ecological stewardship. By holding Mass near the river, this event emphasizes the sacred value of natural ecosystems and reinforces the community's responsibility to protect and sustain the Nabaoy River as an important ecological and socioeconomic resource.



Figure 1. Mass for Creation celebrated along the banks of the Nabaoy River, highlighting the integration of faith and environmental stewardship.

In Figure 2, the BIOME 9 event featured a World Café session, which took place following a series of presentations delivered by scientists and engineers. This interactive session provided participants with an opportunity to engage in structured, small-group discussions, allowing for the exchange of ideas, collaborative problem-solving, and the synthesis of insights from the preceding research presentations. By facilitating dialogue in an informal yet organized setting, the World Café helped capture diverse perspectives and fostered a collective understanding of the key themes emerging from the scientific and engineering studies.



Figure 2. World Café session at BIOME 9 following presentations by scientists and engineers, fostering small-group dialogue and collaborative idea-sharing.

Data Collection

Data Gathering Procedures

Participant Observation

The researchers conducted non-participant and participatory observations throughout the Mass for Creation and Biodiversity Forum. Observations focused on:

1. Framing of biodiversity and ecosystem services during sermons, presentations, and discussions
2. Interactions between clergy, scientists, educators, and environmental advocates
3. Symbolic elements linking faith, science, and environmental responsibility

Field notes were recorded during and immediately after the event to capture descriptive and reflective observations.

World Café Sessions

The primary data source consisted of outputs from World Café sessions, a participatory dialogue methodology designed to elicit collective knowledge and shared meaning through structured conversation (Brown & Isaacs, 2005).

Participants were divided into four discussion groups, each facilitated using guiding questions related to:

- A. Ecological and economic significance of Biome 9 and the Nabaoy River
- B. Perceived environmental threats and governance gaps

C. The role of beliefs and values in biodiversity protection

D. Community-based strategies for conservation and sustainability

Each group documented their discussions using written notes, keywords and visual summaries. The outputs were then presented in a plenary synthesis, which allowed for cross-group validation and refinement of ideas.

2.2.3 Document Review and Informal Dialogue

Additional data was collected through:

- i. Review of forum programs, presentations and educational materials
- ii. Informal conversations with selected participants after the sessions
- iii. These sources provided contextual depth and helped to align the findings emerging from the World Café outputs.

World Café Methodology

The forum used the World Café method, a participatory dialogue process designed to facilitate collaborative knowledge generation and collective meaning-making (Brown & Isaacs, 2005). Participants were divided into four discussion groups, each focusing on guided questions related to biodiversity, ecosystem services, environmental responsibility, and community action in Biome 9.

Each group documented key insights, themes, and proposed actions. The group outputs were consolidated during a plenary synthesis session and served as the main evaluation data for evaluating the forum's outcomes.

Analytical Framework

A thematic analysis was conducted across the four group outputs, focusing on:

- a. Environmental value creation (market and non-market values)
- b. Social capital and institutional trust
- c. Transaction costs and the dynamics of collective action

This framework is aligned with an ecological economics approach that emphasizes institutions, values, and longterm sustainability (Ostrom, 2005; Spash, 2013).

Data Analysis

The data analysis followed a thematic analysis approach, consistent with qualitative research in institutional economics. The four World Café group outputs, observation notes, and supporting materials were reviewed and iteratively coded.

Themes were organized under three analytical lenses:

- I. Environmental value formation (market and non-market values)
- II. Social capital and institutional trust
- III. Transaction costs and collective action mechanisms

This analytical framework reflects the central concerns of ecological economics, particularly the role of values and institutions in maintaining natural capital over time.

Conceptual Framework

The framework is illustrated in Figure 3, which highlights the dynamic interplay between knowledge production, participatory learning, and community-driven ecological action.

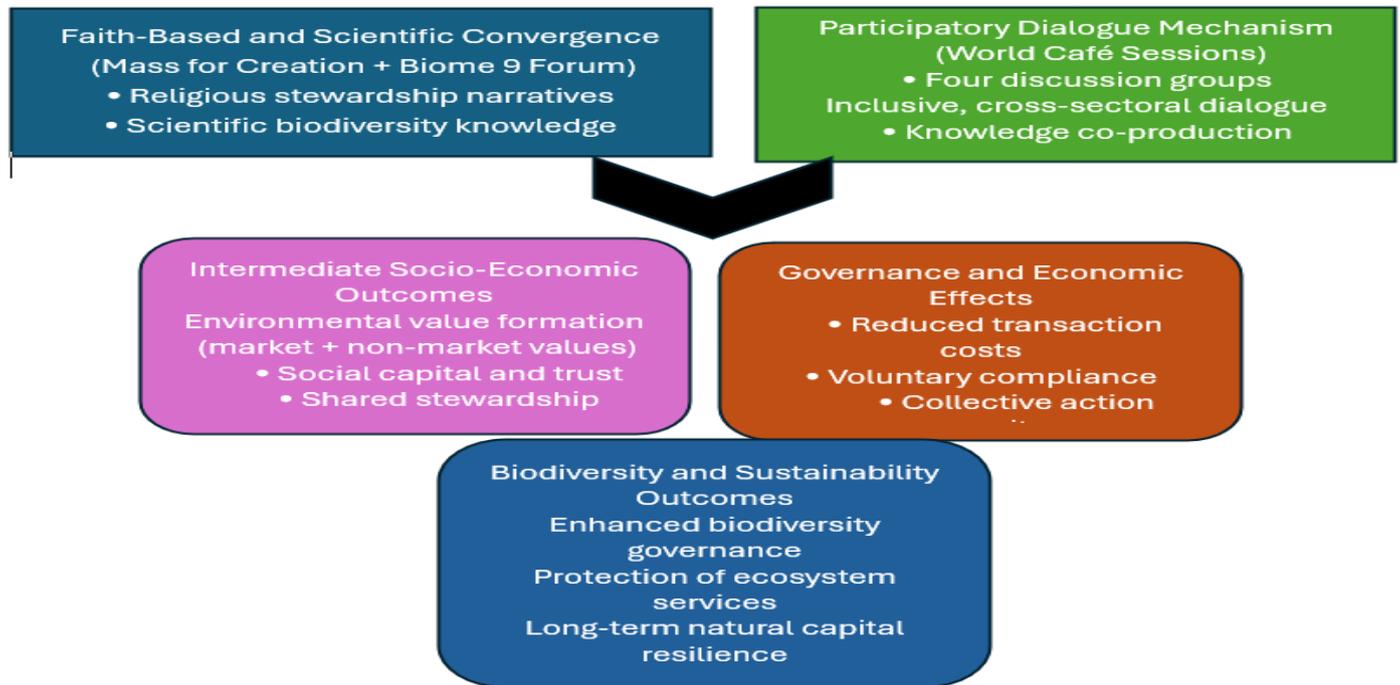


Figure 3. Conceptual framework illustrating the flow from scientific inputs to participatory dialogue and outcome evaluation in the BIOME 9 initiative.

Faith-Based and Scientific Convergence

The framework begins with Mass for Creation and Biome 9: A Biodiversity Forum, which functions as a hybrid platform that combines religious celebrations and scientific discourse. In ecological economics, this convergence represents the informal institutions, non-market mechanisms that shape environmental values and behavior.

Religious narratives frame biodiversity conservation as a moral and spiritual responsibility, while scientific inputs provide an empirical basis for ecosystem services and biodiversity loss. Taken together, these elements expand environmental assessments beyond narrow economic metrics.

Participatory Dialogue Mechanism (World Café Sessions)

The World Café Sessions serve as the central mediation process within the framework. By organizing participants into four discussion groups, the forum enables inclusive dialogue between clergy, scientists, educators, and environmental advocates.

From an institutional economics perspective, this mechanism facilitates the co-production of knowledge, reduces power asymmetries, and increases the legitimacy of shared conclusions. The participatory nature of the World Café allows abstract scientific and ethical concepts to be translated into locally meaningful insights and action proposals.

Intermediate Socio-Economic Outcomes

The dialogue process produced three key intermediate outcomes:

- Environmental value formation: Participants articulated the market and non-market values of the Nabaoy River, including cultural, spiritual and intergenerational values.

- Social capital and trust: Repeated interactions and shared reflections strengthened relationships across sectors.
- Shared stewardship norms: Conservation was internalized as a collective responsibility rather than externally imposed regulations.

These outcomes align with ecological economics' emphasis on values, institutions and social relationships as the foundation of sustainable resource management.

Governance and Economic Effects

The strengthened social capital and shared norms led to economic governance effects, particularly:

- Lower transaction costs, as trust reduced the need for monitoring and enforcement
- Voluntary compliance, driven by moral legitimacy rather than coercion
- Enhanced collective action, enabling cooperative biodiversity initiatives

These effects illustrate how informal institutions can complement formal environmental policies, making governance more cost-effective and socially embedded.

Biodiversity and Sustainability Outcomes

At the final stage, the framework links socio-economic processes to tangible sustainability outcomes, including:

- Improved biodiversity governance
- Protection of ecosystem services critical to local livelihoods
- Increased resilience of natural capital in the Nabaoy River system

This reflects the ecological economics principle that long-term economic well-being depends on maintaining the integrity of ecological systems.

RESULTS

Environmental Value Creation

Across all four World Café groups, participants articulated the value of the Nabaoy River and Biome 9 beyond conventional economic metrics. Ecosystem services such as water regulation, biodiversity conservation and ecological resilience were repeatedly linked to moral responsibility, intergenerational equity and spiritual meaning.

Participants highlighted that environmental degradation will impose long-term economic costs on communities, including reduced livelihood opportunities and increased vulnerability to environmental risks. This suggests an expanded valuation framework consistent with ecological economics, where natural capital is seen as fundamental rather than replaceable.

Social Capital and Trust Building

A recurring outcome identified across the group discussions was the strengthening of social capital. Participants noted that this forum created a rare space for inclusive dialogue between sectors that often operate independently of religious institutions, the scientific community, educators and environmental advocates.

Mutual trust and understanding emerged as key outcomes, with participants expressing an increased willingness to collaborate on future biodiversity initiatives. This enhanced social capital is considered essential for sustained collective action and collaborative environmental governance.

Integration of Beliefs and Scientific Knowledge

Results show a strong convergence between faith-based stewardship narratives and scientific explanations of biodiversity loss and ecosystem services. Participants reported that scientific data gained greater relevance and legitimacy when framed in moral and spiritual language.

This integration helped translate abstract ecological concepts into culturally meaningful obligations, reinforcing long-term conservation attitudes.

Governance and Action-Oriented Outcomes

Four groups suggested practical follow-up actions, including:

1. Community-based biodiversity monitoring
2. Faith-led environmental education programs
3. Ongoing science-faith forums for policy dialogue

This output reflects a preference for participatory and voluntary governance mechanisms over purely regulatory approaches, suggesting a potential reduction in enforcement and coordination costs.

Strengthening Environmental Stewardship Norms

Across all four World Café groups, biodiversity conservation was framed as a shared moral and scientific responsibility. Participants emphasized stewardship, intergenerational equity, and care for creation, reflecting principles articulated in faith-based environmental ethics (Francis, 2015). This framing reinforced the long-term valuation of ecosystem services over short-term economic exploitation.

Building Social Capital and Multi-Sectoral Coordination

Group outputs highlighted increased trust and collaboration among educators, scientists, religious leaders, and advocates. Participants identified this forum as a rare space for equitable dialogue across sectors, strengthening the social capital essential for cooperative environmental governance (Putnam, 2000).

Recognition of Non-Market Ecosystem Values

All groups identified the cultural, spiritual and educational values of the Nabaoy River in addition to the provision and regulation of services. These non-market values broaden the economic understanding of the river as natural capital, consistent with ecological economics' critique of purely market-based valuation (Costanza et al., 1997).

Implications for Biodiversity Governance

Participants suggested community-based monitoring, religiously led environmental education, and ongoing science-religion dialogue as practical outcomes. These suggestions suggest a reduced reliance on coercive enforcement mechanisms and an increased preference for voluntary compliance.

DISCUSSION

Faith-Based Forums as Informal Economic Institutions

These findings support the view that trust-based biodiversity forums function as informal economic institutions that shape environmental choices and behavior. By embedding conservation within a shared moral framework, these forums facilitate the internalization of environmental costs and benefits, reducing reliance on external incentives or sanctions (North, 1991).

This is consistent with ecological economics critiques of market-based conservation strategies and underscores the importance of cultural institutions in maintaining natural capital.

Implications for Transaction Costs and Collective Action

From an institutional economics perspective, the strengthened social capital observed during forums suggests lower transaction costs for collective environmental action. Trust, shared norms, and moral legitimacy reduce the need for extensive monitoring and enforcement, making conservation initiatives more economically efficient (Ostrom, 1990).

The World Café methodology further supports these findings by encouraging equitable participation and the coproduction of knowledge, increasing ownership of proposed actions.

Contributions to Ecological Economics and Policy

This study contributes to ecological economics by empirically illustrating how non-market institutions—specifically faith-based forums—influence environmental assessment and governance. The results suggest that policymakers and development planners should recognize religious and cultural platforms as strategic partners in biodiversity conservation, especially in contexts where formal governance capacity is constrained.

Integrating religion-science dialogue into environmental policy frameworks can enhance legitimacy, compliance, and long-term sustainability outcomes.

Limitations and Future Research

The study is limited by its qualitative design and focus on a single event. Future research could:

- A. Quantitatively assess behavioral change following faith-based forums
- B. Compare outcomes with secular biodiversity dialogues
- C. Evaluate long-term impacts on ecosystem service management

Such studies would further strengthen the empirical foundation for incorporating cultural institutions into ecological economic analysis.

CONCLUSION AND RECOMMENDATION

BIOME 9, together with the Mass for Creation, demonstrates a holistic approach to environmental advocacy by integrating scientific discourse, participatory dialogue, and spiritual reflection. The event emphasizes that ecological stewardship is not just a technical or policy concern but also a moral and communal responsibility. Through scientific presentations and World Café discussions, participants develop shared insights and concrete perspectives on biodiversity protection, while the Mass for Creation reinforces this commitment by grounding it in faith-based values of care for creation. Collectively, BIOME 9 and the liturgical celebrations strengthen environmental awareness, foster unity among diverse stakeholders, and emphasize the importance of aligning science, community engagement, and spirituality in advancing sustainable and ethical environmental action.

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