

Communication

Forest Certification: More Than a Market-Based Tool, Experiences from the Asia Pacific Region

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Abstract: Over the last 25 years, the global area of certified forests has grown rapidly and voluntary forest certification has become recognized as an effective tool to engage international markets in improving sustainability within forest management units. However, the bulk of this growth has occurred in North America, Northern Europe, Australia, and New Zealand, with relatively limited uptake in the tropics. Since its creation, forest certification has been largely understood as a “market-based” mechanism, in contrast to government-led policies and regulations. Through the experience of the Responsible Asia Forestry and Trade (RAFT) partnership in the Asia Pacific region, we find that the framing of forest certification as voluntary and market-based, and as a mechanism to overcome governance failure, has created an artificial dichotomy. In this dichotomy, voluntary certification and regulatory measures to promote sustainable forest management are conceived of and pursued largely independently. We argue that it is more constructive to view them as complementary approaches that share a common goal of increasing sustainability across the forestry sector. In practice, forest certification interacts with conventional governance institutions and mechanisms. Understanding these interactions and their implications, as well as additional possibilities for interaction, will help in realizing the full potential of forest certification.

Keywords: sustainable forest management; voluntary; market-based; regulatory; forestry; partnership

1. Introduction

In the late 1980s, increasing concerns over global tropical deforestation and forest degradation, coupled with the failure of early intergovernmental efforts to curb forest loss, especially in the tropics [1], led international non-state actors to look for alternative approaches to strengthen forest governance. Forest certification emerged as a new voluntary mechanism to improve forest management by establishing multi-stakeholder platforms and processes for standard setting, and linking the buyers and sellers of wood products from responsibly managed forests. Forest certification aims to enable consumers to identify and choose wood products from responsible sources, with the logic that this provides market incentives for industry players to produce and procure products that conform to higher social and environmental standards [2]. Over the last 25 years, the global area of certified forests has grown rapidly and voluntary forest certification has become recognized as a valuable and effective tool to engage international markets in improving sustainability within forest management units [3]. Despite its rapid expansion, the reach of forest certification has remained largely limited to North America, Northern Europe, Australia, and New Zealand, with limited uptake in the tropics [4].

The Responsible Asia Forestry and Trade (RAFT) partnership is a consortium of seven organizations that have been working together for 10 years to improve the sustainability of tropical forest management across the Asia Pacific region. This work has included providing technical support and training to forest companies and community forestry operations covering more than nine million hectares towards legality verification and sustainable forest management certification (i.e. in Indonesia, Laos, Papua New Guinea and Vietnam; Malaysia as well, however as RAFT has not worked in Malaysia since 2011, it is not covered in detail here). RAFT has also worked with national and sub-national governments to strengthen regulatory measures that support sustainable management of natural production and plantation forests, including large-scale industrial and small-scale community-based operations (i.e. in China, Indonesia, Laos, Myanmar, Papua New Guinea, and Vietnam; as above regarding Malaysia.). RAFT implementing partners include: The Nature Conservancy (TNC), the World Wildlife Fund (WWF), the Institute for Global Environmental Strategies (IGES), The Center for People and Forests (RECOFTC), the Tropical Forest Foundation (TFF), TRAFFIC, the Wildlife Trade Monitoring Network and TFT (The Forest Trust).

Forestry is a complex sector, where access to markets that demand responsibly sourced products is but one of many factors influencing forest management practices. In this context, forest certification has been largely understood by those it aims to benefit, as well as its promoters, primarily as a “market-based” mechanism, in contrast to government-led policies and regulations. From this perspective, forest certification represents a form of private forest governance that is distinct from state-centered governance. Through the combined experience of the RAFT partnership and the analysis of practical experience from the Asia Pacific region, we find two problems with this narrow focus on forest certification as a market-based mechanism. First, this narrow understanding places unnecessary limitations on how forest certification is implemented and evaluated, by failing to recognize its contribution to other forms of governance and processes. Second, it limits our understanding of the potential of forest certification to enable lasting environmental, social, and economic benefits from the world’s remaining tropical production forests.

In practice, forest certification interacts with conventional governance frameworks and institutions, including government agencies that regulate domestic forestry and the timber trade. Moreover, governance mechanisms that were pioneered by sustainability certification, such as multi-stakeholder decision-making and product traceability, are now being employed in other initiatives involving setting forest standards and verification, including the EU’s Forest Law Enforcement Governance and Trade (FLEGT) Action Plan [5]. Understanding these interactions and their implications, as well as additional possibilities for interaction in support of sustainability, will help forest certification realize its full potential. This communication presents observations and reflections derived from practical experience supporting both the application of forest certification, and policies and regulations designed to support legal and sustainable forest management. Through this communication, the RAFT partnership aims to inform the global debate on forest certification, and stimulate new ways of thinking and research ideas that may improve its effectiveness as a sustainability tool in the Asia Pacific region and globally.

2. Forest Certification in the Asia Pacific Region

When initially conceived, forest certification aimed to improve forest management by creating a market incentive for forest owners, managers, and buyers of wood products to comply with applicable laws and follow best social and environmental practices. This was to be achieved through the development of forest management standards with criteria and indicators that allowed individual forest management units to be assessed against the standard by an independent third party. Certificates could then be used as marketing tools by companies seeking price premiums or a competitive advantage in markets demanding responsibly sourced forest products. These standards would be developed through transparent and participatory processes open to multiple forestry stakeholders. The results of assessments against a forest certification standard would be publicly available. Grievance mechanisms

would further be established allowing for feedback and concerns about the issuance of certificates or practices of certificate holders to be provided back to a standards organization (or “scheme owner”).

At the time, voluntary schemes were perceived as an alternative to government policies and regulations, which were deemed inadequate and ineffective by a group of non-state actors who had participated in the 1992 Earth Summit in Rio de Janeiro, Brazil. The Forest Stewardship Council (FSC) and the Programme for the Endorsement of Forest Certification (PEFC) emerged out of this realization in 1994 and 1999, respectively [6,7], as the dominant international forest certification standards organizations. Both are active in the Asia Pacific region. While these two certification systems share similar missions, they differ in standard development processes and governance structures. FSC has established international principles and criteria that are used to develop national standards through collaborative and consultative processes with representation from environmental, social, and economic stakeholders [8]. PEFC uses a set of global Sustainability Benchmarks to endorse national forest certification systems developed by national stakeholders following the required procedures, including requirements for stakeholder engagement [9].

Forest certification was first introduced to tropical forested countries in the Asia Pacific region in the early 2000s and picked up steam a decade later. Together, by the end of June 2018 the FSC and PEFC certifications had reached over 12 million hectares of forests in countries where RAFT has operated (Table 1). This accounts for 13.7% of the forest area of these countries that has been allocated for timber production. Forests in RAFT countries are mainly under public ownership, with the exception of Papua New Guinea, where 97% of the forests are held under customary tenure [10]. In the other four countries, public ownership ranges from 100% (Lao PDR) to 73% (Vietnam) [10]. However, there has been a general trend towards privatization of forest rights in Asia, including through the granting of timber rights to companies and forest management and use rights to communities for a set period of time [11]. It is most often the holders of these timber, management and use rights that may decide to pursue certification and thus become the “certificate holder” for a given forest management unit.

Table 1. Forest Stewardship Council (FSC) and Programme for the Endorsement of Forest Certification (PEFC) certifications in selected Responsible Asia Forestry and Trade (RAFT) priority countries [10,12,13].

Tropical Forest Countries Engaged by Raft	Forest Area Certified (ha) (June 2018)		Production Forest (ha)	Share of Forest Certification in Total Production Forest Area
	FSC	PEFC		
Indonesia	2,829,294	3,883,895	57,668,000	11.6%
Malaysia	755,584	4,382,719	12,419,000	41.4%
Papua New Guinea	43,990	-	8,758,000	0.5%
Laos	18,010	-	2,693,000	0.7%
Vietnam	227,386	-	6,870,000	3.3%
TOTAL	3,874,264	8,266,614	88,408,000	13.7%

Several scientific studies have been conducted on the impact of forest certification in the Asia Pacific region, mostly focusing on FSC certification of operations in Indonesia and Malaysia. These studies have found that certification has had positive environmental and social impacts. According to Miteva et al. [14], certification reduced forest cover loss and air pollution and led to fewer malnourished people in communities living in and around forest concessions in Kalimantan, Indonesia. Studies in Sabah, Malaysia, reported that certified logging concessions had higher carbon density in above-ground vegetation [15] and greater mammal species richness, especially of endangered species [16], compared to non-certified concessions. Given that forest certification can have positive impacts on the environment and people, there is good reason to promote certification for conservation, and more broadly, for realization of the UN Sustainable Development Goals (SDGs) [17].

However, the uptake of voluntary forest certification in tropical forested countries of the Asia Pacific region has been slow. The reasons for this include a lack of attractive price premiums for certified products [18], low demand for evidence of legality and sustainability in the rapidly growing markets

of the region [19], and the high cost of complying with certification standards in socially and politically challenging environments, and in biodiversity-rich forests [20]. Despite efforts of the certification schemes to increase the accessibility of certification to communities and smallholders, the challenges for these groups are particularly acute. For them, the procedures can be complex and difficult, and it is often challenging to supply the volumes of timber that markets will accept. Commercial restrictions placed by governments can present another obstacle [21,22]. As a result, certification of community-based forest management has only been possible with large amounts of financial and technical support. The challenges described above are well-known and often discussed in international forums on forest management, but discussion of solutions that governments, businesses, and communities across the region can realistically put into practice is lacking. In writing this communication, RAFT partners were interested in identifying practical solutions to these challenges, drawing on RAFT's experiences and observations in the Asia Pacific region.

3. Discussion: An Artificial Dichotomy between Regulatory and “Market-Based” Approaches

The scale and complexity of challenges facing efforts to improve sustainability in forestry sectors across the Asia Pacific region demands a range of tools and approaches. Ideally, these would be applied in a complementary manner as part of a comprehensive strategic approach. In practice, different tools and approaches are often applied independently of each other, reflecting different interests, lines of funding, and schools of thought. While each tool and approach emerges from the necessity of addressing a specific type of problem, individually, their impact on tropical forests is restricted by lack of coordination and positioning within a common strategic framework for sustainable forestry. As practitioners, it is through this lens that recognizes the need for complementarity and integration across a range of tools and approaches that we have observed, applied, and thought about forest certification, its effectiveness, and its potential in the Asia Pacific region. We have observed that the framing of forest certification as voluntary and market-based, and as an approach to overcome governance weaknesses and failures, has created an artificial dichotomy. In this dichotomy, voluntary certification and regulatory measures to promote sustainable forest management are conceived of and pursued largely independently of one another. We argue that it is more constructive to view them as complementary approaches that share a common goal of increasing sustainability across the forestry sector.

3.1. Consequences of the Artificial Dichotomy

There are a number of implications resulting from this conceptual separation of certification as “market-based” from broader forest policy and regulations that have made it difficult to address the challenges that certification faces. Three of these implications observed by the RAFT partnership are outlined in the next sub-sections.

3.1.1. Fragmentation of Sustainable Forest Management Interventions

The conceptual dichotomy described above has led to a tendency to take a fragmented approach toward a common goal of increasing sustainability in the forestry sector. This often results in the absence of overarching strategies and mechanisms for beneficial communications, cross-learning, and sharing of resources across organizations and individuals. This is a tendency that has been observed in several countries in recent years, and can be seen with the focus on measures to demonstrate the legality of timber beginning in the late 2000s. The EU FLEGT Action Plan, for example, has brought substantial and much-needed resources and political attention to improving forest governance through efforts to define and monitor legal timber extraction and trade. However, the institutions working on legality verification and forest certification are often different, with little dialogue and collaboration among them, despite a common interest in improving the overall performance of the forestry sector, and having a lot to gain from working together. Sharing experiences and lessons learned could make both groups more effective, but meetings on the two topics tend to be organized separately.

Non-government partners and supporters of the two bodies of work often practice a similarly siloed approach due to project funds being allocated explicitly to one or the other tool or process. This results in missed opportunities to exchange relevant knowledge, combine resources, and strengthen political support.

Conversely, a powerful example of the benefits brought by collaboration between processes working on legality and certification can be seen in a recent case in Papua New Guinea. In this case, the same department and individuals within the Papua New Guinea Forest Authority (PNGFA), the government agency tasked with promoting the management and wise utilization of forest resources, are responsible for overseeing both legality verification and certification. This has helped to enable learning across the national FSC Standard and Timber Legality Standard development processes that are currently underway. In this case, as a result of individuals and information moving between the two processes, the PNGFA is now in a dialogue with civil society about how to expand the scope of the Timber Legality Standard. This dialogue aims to address a key issue for local resource owners in PNG, using some provisions in the National FSC Standard as a point of reference. Further, the relationships and trust established in one process made it possible to extend such constructive collaboration from one process to another.

Indonesia has one of the longest experiences with both forest certification and timber legality verification in the region, with the nature and tone of interactions between the two processes changing over time. It is widely recognized, however, that the design of Indonesia's mandatory Timber Legality Assurance System (SVLK) and Sustainable Production Forest Management standard (PHPL) applied principles and experiences from forest certification, including key elements, such as increased transparency and participation of local communities and civil society, and the requirement for third-party auditing [23]. Individuals and organizations involved in the design and implementation of certification standards, including some RAFT partners, were invited into the process to design the SVLK and PHPL regulations. This enabled the government to access relevant knowledge and experience from certification, and contributed to the conclusion of the FLEGT Voluntary Partnership Agreement (VPA) with the European Union (EU) in 2014.

3.1.2. Regulatory Obstacles to Community and Small-Scale Forest Management

Another consequence of the conceptual dichotomy has been a general failure to adequately recognize the importance of the regulatory environment in enabling market access and participation as a condition for successful forest certification. This is particularly relevant for smallholders, for many of whom forest certification has proven impractical. Because forest certification is often seen as being outside of regulatory processes, standards development tends to take place independently of government-led reform efforts that could help to overcome regulatory obstacles to the expansion of sustainable forest management (and thereby forest certification). Across the Asia Pacific region, forest certification has proven particularly challenging for community-managed forests, small-scale tree growers, and small-scale wood processing operations. Some of the reasons given for this include lack of security for land tenure, use, and access, and difficulties complying with regulatory regimes for timber production [21,22,24]. In Myanmar, for instance, until recently local communities did not have the legal right to harvest timber for commercial purposes. In northern Laos, the costs and complexities for small-scale teak growers of legally registering teak woodlots, including the need for government approval to harvest, dissuade many from complying [25]. This lack of a basic enabling environment for community participation in sustainable forestry has rendered much of the effort to adapt voluntary forest certification standards for community forest management ineffective.

By contrast, processes associated with SVLK in Indonesia demonstrated the flexibility for a mandatory verification system to adapt the legal frameworks in support of small-scale private tree growers and processors. When first introduced, SVLK required a household wanting to sell even a single tree legally to register as a business and secure a taxation number, among other requirements for establishing a commercial entity under Indonesian law, all at a relatively high cost for a low return.

To address this problem, the Government of Indonesia introduced the Declaration of Conformity (DKP) designed to enable timber with a low illegality risk from non-SVLK timber sources to enter the supply chain legally. DKPs are relatively simple self-declaration forms completed by a timber supplier and provided to a buyer who is responsible for checking the ownership of the land from which the timber is sourced [26]. This kind of regulatory reform is made possible by virtue of timber legality definitions and assurance systems themselves being part of a regulatory approach. Such options for reforming regulations that may stand in the way of expanding or improving the effectiveness of certification as a sustainability tool are not as easily accessible through voluntary certification standards development processes.

3.1.3. Alignment with Policy Priorities

A third implication of the artificial dichotomy is insufficient recognition of how forest certification can help governments deliver on their policy priorities. This has often resulted in missed opportunities to incentivize uptake of forest certification, either financially or by presenting it as a tool for forest managers to demonstrate regulatory compliance. By improving forest management standards in timber concessions through participatory and transparent processes, forest certification can potentially contribute to national economic, social, and environmental goals. Yet, there are surprisingly few examples of governments viewing certification as a means to achieve policy priorities, and implementing measures to make certification more accessible to forest managers and wood product manufacturers.

In the case of Indonesia, with the introduction of the SVLK and PHPL standards as regulatory requirements, a perception among certification practitioners has emerged of voluntary, “market-based” certification standards being in competition with the government’s regulatory approach. This dynamic has created political and conceptual obstacles to collaboration across the diverse schemes, individuals, and organizations involved. This distinction has also led to an understanding among many businesses that voluntary certification will not help them to meet regulatory requirements, in spite of practical similarities between management system and capacity requirements across both voluntary and mandatory standards. Among many companies in Indonesia, this has reinforced the notion of voluntary certification as “market-based”, with the effect that only those selling to markets where demand for certified products is strong are likely to view voluntary certification as a worthwhile investment. This misses an opportunity to seek to improve forest management across the sector by incentivizing companies who may not be selling into markets that demand responsibly sourced products, but are willing to invest in reaching a higher standard to demonstrate compliance with domestic regulatory requirements.

In Vietnam, Thua Thien Hue Province offers an encouraging example of how a better appreciation of the role of certification in achieving high-level policy goals and targets has increased accessibility to certification. Timber products are some of Vietnam’s most important exports, and continued development of the country’s wood processing capacity toward the export of higher value products is a clear policy priority of the Central Government [27]. The European Union remains a major wood products market for Vietnam, accounting for approximately 10% of total wood products export value [28]. From 2010 to 2018 the two governments undertook formal negotiations for a VPA, which was signed on 19 October 2018. As part of the FLEGT process that supported the negotiations, the provincial government and industry participated together in a series of public and private sector dialogues. Through these dialogues, both parties learned of the opportunity presented by the European market and the potential role of certification in helping industry to implement the national policy priority to move the forest sector up the value chain. As a result, the provincial government introduced a subsidy of 13USD per hectare of FSC certified forest for both plantation companies and smallholders. In 2018, a total of 80,000USD has been paid to forest owners to help cover costs associated with forest certification.

This example also offers an important reminder that “government” itself is a stakeholder group, consisting of national government agencies and sub-national governments. Sub-national governments

have their own policy targets and development programs and have an important role to play in promoting sustainability of the forestry sector. Strategies to increase the accessibility of forest certification should, thus, consider the potential role for certification in implementing policies and programs at both national and sub-national levels.

3.2. *When Regulatory and Voluntary Work Together*

Our experience promoting sustainable forest management in the Asia Pacific region over the last 10 years has taught us that forest certification should not be viewed as a stand-alone form of private forest management or a solution to governance failure. To the contrary, forest certification should be incorporated into a comprehensive strategy to enhance forest governance and strengthen public administration of forests. Without a comprehensive strategy, supportive policies, effective implementation, and healthy institutions will be lacking, making forest certification costly and difficult. Further, without a comprehensive strategy, the potential for certification to positively influence the development of regulatory regimes will go unrealized. Looking ahead, and drawing on the experiences highlighted above, we see opportunities to achieve greater sustainability gains by better understanding the opportunities for increased complementarity and strategic alignment across forest certification and government-led initiatives. Here we provide examples of the kinds of broader regulatory and institutional contexts in which the potential role and effectiveness of forest certification should be assessed (Laos, Myanmar). We also find some examples of regulatory processes that introduce ideas and practices that could be considered or adapted in future efforts to advance certification in the region (Indonesia, Vietnam).

3.2.1. Prime Ministerial Order 15 in Laos

In 2016, the Prime Minister's Office in Laos issued Decree 15 on Strengthening Strictness of Timber Harvest Management and Inspection (PMO 15). The decree is already having a major impact on the sector, in particular through a total log export ban, which dramatically decreased the flow of raw logs from Laos into neighboring Vietnam within months of its enactment [29]. At the same time, the decree has generated confusion about the trade in planted timber and what this means for the participation of a growing number of small-scale teak growers in the forestry sector. PMO 15, together with Laos' FLEGT process, has prompted an unusual platform in a relatively centralized country for dialogue and consideration of further regulatory reform to achieve the central objectives of PMO 15, including strengthening added-value timber processing in the country. In this context, there is an opportunity to better understand the role and value of certification in supporting the government's agenda. Ongoing dialogues and projects that aim to support the successful implementation of PMO 15 could present an opportunity to address some of the regulatory- and cost-related obstacles to the long-term success of certification in Laos.

3.2.2. Forestry Sector Reform in Myanmar

In Myanmar, as in many tropical forested countries in the Asia Pacific region, a relatively small portion of overall forest product exports are sent to markets where demand for certified products is strong. Further, many of the necessary regulatory and capacity prerequisites for forest certification to have a significant positive impact are not in place. The Ministry of Natural Resources and Environmental Conservation (MONREC) has embarked on an ambitious forestry sector reform program that aims for the sustainability of the sector as a whole in the face of severe forest loss and degradation across Myanmar's forest estate, of which restoration and plantation development are expected to be an important part [30]. The role and effectiveness of certification in Myanmar should be considered in the context of this broader reform effort, through which regulatory changes and incentive mechanisms that are supportive of certification may be available.

Further, as of 2018, the mandate for developing Myanmar's timber legality assurance system (MTLAS) rests with the Myanmar Forest Certification Committee (MFCC), which is also responsible

for developing Myanmar's national forest certification standards. The MTLAS is not recognized widely by stakeholders in Myanmar's FLEGT process and requires further stakeholder engagement. However, from an institutional perspective, this increases the prospects that the legality verification and certification systems development processes can make the most of available technical expertise and resources, and that both inform and learn from one another.

3.2.3. Reduced Impact Logging—Carbon in Indonesia

Indonesia has been a global leader in recognizing the important role of sustainable forest management in combatting climate change. The country has set a target of reducing its greenhouse gas emissions by 29% by 2030, with 60% of those reductions expected to come from forest and peat land [31]. Reduced Impact Logging-Carbon (RIL-C) could play an important role in achieving this target. RIL-C is a set of forest management practices to reduce carbon emissions from logging, together with a methodology to credibly quantify reductions achieved through the use of these practices [32,33]. At the national level, the Ministry of Environment and Forestry (MoEF) has held a series of focus group discussions with industry and NGOs to inform the development of a national RIL-C policy that would be implemented across the country. These discussions have included a focus on possible incentive mechanisms that would reduce operational costs for concessions that demonstrate compliance with the regulation. While the policy is yet to be enacted, the effort to explore regulatory measures to reduce the costs of compliance offers a potential model for similar discussions about reducing costs of certification where it is shown to be contributing to national policy targets.

3.2.4. Sustainable Forest Management Circular in Vietnam

As part of the process for developing a national sustainable forest management standard in 2017, the Vietnam Administration for Forest (VNFOREST) undertook a review of Decree 38 on Sustainable Forest Management, the main regulation defining and governing sustainable forest management in the country. The process included a review of the policy, including several consultations and field assessments in three provinces. The purpose of this review was to assess compliance with the existing regulation and understand the challenges and opportunities for sustainable forest management, with materials documenting the process developed, shared, and discussed in four consultation workshops. The result was a new "circular on sustainable forest management", which replaced Decree 38 in January 2019 [34]. These changes to the regulatory environment are expected to enhance the successful implementation of Vietnam's forthcoming national forest certification standard, while supporting VNFOREST to effectively implement elements of Vietnam's new Forestry Law (2019). This review process illustrates a practical case where certification is considered as one of several complementary instruments for sustainable forest management. This has enabled identification and discussion of measures to address some of the broader obstacles to sustainable forest management through policy reform. Among other changes, the new circular includes detailed guidance on management plans for distinct forest types, including for households, communes, or individuals managing multiple forest types [34].

4. Conclusions and Future Research

Too often debates and dialogues about forest certification in the tropics focus on the well-known challenges certification faces, with little presented on effective solutions to address these challenges. This lack of ideas for effective solutions stems from a narrow perspective of certification as a market-based instrument that can and should operate independently from regulatory regimes. The RAFT partnership's experiences and observations have led us to conclude that to realize the full potential of forest certification as a sustainability tool in the Asia Pacific region, we, as a community of researchers, practitioners, supporters, and policymakers, must actively recognize the inter-connectedness of both market-based and regulatory approaches. The boundaries between the two approaches are becoming "blurrier" as more and more governments seek to respond to market demands for increased transparency

and stronger supply chain controls. The strengthening of regulatory approaches, both in terms of the content of laws and their implementation, benefits certification, while certification standards and processes can benefit regulatory development and enforcement. Efforts to better align and even integrate these approaches and the processes associated with them could remove unnecessary obstacles and generate significant gains.

While the anecdotal cases presented above suggest some ways forward, there is a need for more comprehensive research on alignment and integration of voluntary market-based and regulatory approaches. Based on RAFT's experiences, we have identified three research questions to deepen understanding of where potential for alignment and integration exists, with a view to articulating practical measures to realize the full potential of forest certification:

- Why, in some cases, have voluntary certification and regulatory approaches acted at cross-purposes, while in other cases mutual benefits have been realized?
- Where does the potential for alignment and integration of voluntary and regulatory approaches with clear mutual benefits exist, both theoretically and practically in specific contexts?
- What processes and resources can be mobilized to realize this potential efficiently and effectively?

A research program to address these questions would benefit from a transdisciplinary approach, as defined by Brandt et al. (2013) [35]. Transdisciplinary research engages practitioners in refining the research questions and analysis. Such engagement would focus the research on practical problems and solutions. The research would also benefit from political economy and institutional analytical frameworks to understand the deeper structures and processes hindering alignment and integration and how these might be overcome.

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