HARMONITOR

D7.6
Recommendations for the Continuous Improvement and Harmonisation of Certification Schemes

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REPORT

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Executive Summary

Sustainability Certification Schemes and Labels (CSLs) can significantly contribute to advancing the EU bioeconomy by verifying and promoting environmental, social, and economic sustainability across bio-based value chains. The growing complexity of these value chains, which often span international borders and involve diverse stakeholders, presents significant challenges in ensuring comprehensive sustainability coverage. Recognizing this, the HARMONITOR project has been established to address these challenges and enhance the effectiveness of CSLs.

The HARMONITOR project underscores the importance of harmonization, transparency, and collaboration in overcoming existing gaps within the certification landscape. A participative Roundtable Platform for CSLs has been created by the project to capture CSLs' dynamic evolution, encouraging harmonization and continuous improvement through the exchange of knowledge and best practices. This platform not only fosters innovation but also strengthens stakeholder engagement by promoting a shared understanding of sustainability standards.

Key recommendations for improving CSLs include the development of standardized metrics for performance evaluation, providing quantitative data to support informed decision-making, and enhancing transparency in both processes and outcomes. The project emphasizes the importance of systematically reviewing and comparing the performance of CSLs to identify areas of underperformance and address them effectively. Furthermore, it advocates for maintaining and strengthening the collaborative review platform to ensure ongoing dialogue among stakeholders.

Another critical aspect recommended by the HARMONITOR project is the focus on co-regulation opportunities, aiming to bridge policy gaps and integrate CSLs more effectively into regulatory frameworks. To support this, the project applies evidence-based approaches, including analyses of certification's costs and benefits, trade impacts, barriers and challenges, current use of CSLs in co-regulation, their (dis)advantages, and stakeholder positions. By promoting evidence-based approaches, the project supports the credibility and legitimacy of CSLs, ensuring they remain robust tools for sustainability advancement.

The recommendations outlined in this report serve as a roadmap for the continuous improvement of CSLs. By addressing policy gaps, encouraging collaboration, and fostering capacity building, the HARMONITOR project seeks to improve the effectiveness and robustness of CSLs in the EU bioeconomy. The outcomes of HARMONITOR are expected to reinforce sustainable practices, enhance stakeholder trust, and drive the long-term success of bio-based systems within the European Union.

1 Introduction: Enhancing Sustainability Certification Schemes in the EU Bioeconomy

The increasing focus on the bioeconomy has led to significant advancements in research, development, and policy efforts, particularly in the circular design and the sustainability of bio-based materials and products. However, determining and regulating the sustainability of bio-based value chains remains challenging due to their complexity and international scope. Sustainability certification schemes and labels (CSLs) play an important role in verifying and promoting the environmental, social, and economic sustainability of these value chains. The importance of robust and effective CSLs is magnified by the intricate nature of such chains, which often involve multiple intermediate products and diverse stakeholders.

The '*Harmonisation and Monitoring Platform for Certification Schemes and Labels to Advance the Sustainability of Bio-Based Systems'* (HARMONITOR) project has been established to address these challenges, aiming to enhance the effectiveness and robustness of CSLs within the EU bioeconomy. It seeks to foster harmonization and continuous improvement of these schemes while promoting transparency across bio-based value chains. To achieve this, the project has outlined five specific objectives:

- Creation of a Review Platform: Establishing a participative review platform to capture the dynamic evolution of CSLs, encourage harmonization, and facilitate continuous improvement through the exchange of knowledge and best practices.

- Promote Data Analysis and Dissemination: Providing quantitative, transparent data on bio-based value chains by analysing trade flows (certified and non-certified) and assessing direct and indirect costs and benefits of certification.

- Comparison of Schemes Performance: Reviewing and comparing performance of CSLs, their requirements, assurance mechanisms, and governance systems of to ensure comprehensive sustainability coverage for bio-based systems.

- Monitoring Effectiveness: Developing and applying monitoring tools to evaluate the effectiveness and robustness of CSLs.

- Exploring Co-Regulation Opportunities: Improving the understanding of both the opportunities and limitations of utilizing CSLs as tools for co-regulation.

The HARMONITOR project emphasizes the need for collaboration and transparency to maximize the impact of its outcomes. By continuously reviewing, monitoring, and improving CSLs, the project aims to support their critical role in advancing the EU bioeconomy. The project recommendations, as outlined in this report, serve to enhance effectiveness, transparency, and credibility of CSLs and the broader system in which they operate, ultimately shaping the future of sustainable practices within the EU bioeconomy.

2 Role of Certification Schemes in Advancing the EU Bioeconomy

CSLs can play a significant role in fostering responsible practices within the EU bioeconomy. They enable comprehensive evaluations of bio-based products, ensuring that environmental, circularity, social, and economic considerations are addressed effectively. Contrary to assumptions that the bio-based economy is inherently sustainable, rigorous assessments comparable to those conducted for fossil-based products are necessary. CSLs, when robustly implemented, can facilitate such evaluations and provide valuable comparisons between bio-based and fossil-based options.

Consumption-based accounting within the EU bioeconomy highlights significant disparities, revealing higher greenhouse gas emissions, land use, and water consumption compared to production-based accounting. HARMONITOR's Deliverable 6.2 'Environmental Externalities of EU's Bioeconomy' presents and discusses these disparities in detail. This analysis underscores the importance of imports and external impacts beyond EU borders, further emphasizing the transboundary role of CSLs in promoting a sustainable bioeconomy.

In specific areas of the EU bioeconomy, CSLs are utilised to support compliance with clearly defined policy requirements, with their application being predominantly policy-driven, for example in the bioenergy sector, where CSLs are used to demonstrate compliance with sustainability criteria under the Renewable Energy Directive. They provide a framework for evaluating and verifying that products, services, or processes meet specific standards related to environmental, social, and economic criteria. Conversely, in other sectors, such as in chemistry or textiles, certification is largely industry-driven, aimed at substantiating particular sustainability attributes of biobased products. For these sectors, CSLs hold the potential to address policy gaps and can play a crucial role in promoting sustainability and ensuring responsible practices across various sectors. They have the capability to evolve more rapidly than formal regulations, adapting in response to advancements in science, technology, and the evolving perspectives and needs of stakeholders. As a result, CSLs can effectively guide operators toward sustainability across value chains and introduce novel sustainability frameworks that extend beyond existing legal stipulations. Key roles and advantages of using CSLs are described in Table 1.

Table 1. Roles and Advantages of Using Sustainability Certification Schemes.

Key Roles and Advantages	Description
Promoting Sustainability	Setting standards that encourage protection of ecosystems, responsible resource management, reduction of pollution. They ensure that certified entities adhere to practices that minimize their environmental impact.
Ensuring Compliance	Verifying compliance with legal and regulatory requirements, ensuring adherence to national and international laws related to land use, labour rights, environmental protection, and more.

Enhancing Credibility and Trust	Providing third-party verification of practices, building stakeholder confidence and trust in certified products or services.
Facilitating Market Access	Opening new market opportunities for certified entities by meeting demand for sustainable products, complying with regulations like the EUDR, which mandates that products entering the EU market must not contribute to deforestation.
Improving Governance and Transparency	Improving transparency and accountability when they include adequate requirements for transparency, stakeholder consultation, and robust governance structures.
Driving Continuous Improvement	Identifying strengths and weaknesses in certified entities' practices, and providing actionable recommendations for improvement, contributing to ongoing enhancement of sustainability practices.

To illustrate the role of CSLs, they can effectively contribute to managing risks related to the European Union's Deforestation Regulation (EUDR).[1] The EUDR imposes strict requirements on companies to ensure that products entering the EU market do not contribute to deforestation or forest degradation. HARMONITOR's Deliverable D4.4 'Validation and final comparison study of selected CSLs' discusses in detail how selected CSLs can help manage the following risks:

- **Compliance with Legal Requirements**: CSLs can ensure that certified entities comply with the relevant laws of the country of production, including those related to land use rights, environmental protection, and labour rights. For example, the Forest Stewardship Council (FSC) and the Sustainable Biomass Program (SBP) have standards that align well with the EUDR's definition of legality, covering aspects such as secure land tenure, child labour, forced labour, and anti-corruption measures.

- **Deforestation and Forest Degradation**: CSLs can help ensure that commodities are produced without deforestation or forest degradation. Schemes like FSC and SBP have definitions and standards that align with the EUDR's requirements for deforestation-free production. However, some schemes may need to expand their definitions to fully meet EUDR standards.

- **Corruption Prevention and Conflict of Interest Management**: Effective CSLs include mechanisms to prevent corruption and manage conflicts of interest. For instance, the International Sustainability and Carbon Certification (ISCC) and FSC require corruption checks and have policies to ensure impartiality and transparency.

- **Traceability**: The EUDR emphasizes the importance of traceability, requiring operators to provide geolocation data to verify the origin of products. CSLs like FSC and ISCC have developed tools and modules to enhance traceability and ensure compliance with EUDR requirements.

- **Land Tenure and Indigenous Rights**: Ensuring that land used for commodity production is legally sourced and does not infringe on the rights of Indigenous Peoples

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[1] Webinar by HARMONITOR on how certification can support EU Deforestation Regulation (EUDR) alignment, https://www.youtube.com/watch?v=3t2VtWqPakU

and local communities is crucial. CSLs like FSC, RSPO, and RTRS require clear evidence of legal land rights and compliance with Free, Prior, and Informed Consent (FPIC) principles.

- **Smallholder Inclusion**: Smallholders often face higher risks of engaging in unsustainable practices. CSLs can support smallholders through group certification, tailored programs, and financial assistance, helping them comply with EUDR requirements.

- **Mixing Material Along the Supply Chain**: The EUDR prohibits the mixing of non-compliant materials. CSLs can adjust their systems to ensure that only deforestation-free commodities reach the EU market. Schemes like FSC and RTRS have updated their requirements to include due diligence processes aligned with EUDR obligations.

- **Supplementing Due Diligence**: While certification alone may not be sufficient to fully meet EUDR requirements, it can be part of a broader risk management strategy. Operators should supplement certifications with independent audits, supply chain mapping, and other measures to ensure full compliance.

Despite their benefits, CSLs exhibit significant variability in scope, purpose, ambition, and implementation. The proliferation of CSLs with a large variety of scopes has made evident the need for harmonisation. This need varies considerably depending on the value chain, geographical focus of certifications, addressed markets, and chosen sustainability requirements. This inconsistency necessitates harmonisation through legislative frameworks, guidelines, and defined policy objectives tailored to the bioeconomy. The lack of harmonisation and monitoring has led to knowledge gaps and uncertainties regarding the effectiveness of CSLs in contributing to the sustainability of the bioeconomy, undermining their potential to effectively address critical sustainability challenges.

3 Challenges to Certification

3.1 Policy Integration

The implications of EU bioeconomy policies on sustainability extend beyond the EU borders, highlighting the need to consider their alignment with international regulatory frameworks and voluntary sustainability initiatives such as CSLs during legislative processes. EU bioeconomy policies remain fragmented due to their independent development across sectors. Although several policy frameworks address sustainability priorities aligned with critical bioeconomy risks, there is a noticeable lack of sector-specific targets, particularly outside the energy domain. Moreover, delays in the implementation of circular economy measures, especially concerning product design, have constrained the impact of EU and Member State initiatives on industry practices. To address these limitations, policy efforts must focus on improving the sustainability of bio-based production within industries such as chemicals, textiles, plastics, and construction—areas where bio-based practices already exhibit potential for growth.

Despite their inherent advantages, CSLs face significant challenges, including a proliferation of schemes with varied scopes and assurance models. This diversity, combined with insufficient oversight, undermines their reliability and effectiveness. Regulatory anchorage for CSLs is required to provide appropriate guidelines that align their adoption with EU policy priorities and international sustainable development ambitions.

The ambiguous nature of sustainability requirements within EU policies—excluding the energy sector—further exacerbates the problem by making compliance difficult for companies. Additionally, the progress of EU Member States toward a circular economy has stagnated in recent years, particularly in areas involving product design. Consequently, the current influence of EU and Member State sustainability and circularity policy frameworks on industry practices remains limited, which poses a risk to achieving the objectives outlined in the EU Bioeconomy Strategy.

CSLs have the potential to be a central piece in sustainability co-regulatory processes by complementing EU, national, or regional laws and regulations. For instance, CSLs can be adapted relatively swiftly to accommodate changes in legislation, scientific advancements, and evolving stakeholder and societal ambitions, as seen for example with FSC's adaptations to the EUDR. While the proliferation of CSLs can create challenges for companies, such as inconsistent requirements, their ability to address commodity-specific risks and practices can also be beneficial if appropriately harmonised. Their flexibility allows them to complement public regulations effectively. However, while the theoretical advantages of CSLs are compelling, their practical application is often less robust than anticipated due to inadequate monitoring and oversight mechanisms. Addressing these gaps is essential to maximize their utility in achieving the EU's sustainability and bioeconomy objectives.

3.2 Quantitative Insights into Certified Bio-Based Value Chains

3.2.1 Trade Volume in the EU Bioeconomy

The EU is a significant actor in the trade of bio-based products and resources, both intra-EU and internationally. However, the lack of comprehensive data regarding trade flows of bio-

based products, as well as the proportion of certified bio-based materials, presents challenges to understanding the current state of the EU bioeconomy and the role of CSLs.

In 2021, the trade volume of selected bio-based value chains within the EU exceeded 200 million tonnes, with biological resources and wooden products dominating the figures. Intra-EU trade accounted for most of this volume, surpassing extra-EU imports and exports combined. Among the bio-based products, sugar, starch, and oil crops were primarily directed toward food and feed production, while wooden products led in bio-materials trade, followed by bio-based textiles and fibre crops. Bio-based chemicals represented a mere 0.3% of the overall trade volume, with notable production capacities for substances such as bio-based epichlorohydrin, acetic acid, ethylene, and polylactic acid. Despite these figures, trade data remains incomplete and inconsistent, particularly in niche markets, which hinders accurate reporting across countries.

3.2.2 Sustainability Certification Levels

Certification levels vary significantly across different bio-based products and sectors. Palm oil and wooden products show relatively high levels of certification within Europe, while sugar and sugarcane exhibit lower certification rates. Approximately 56% of European forest areas are certified, suggesting substantial sustainability certification for wooden products. However, detailed data on the certification of specific wooden products remains elusive.

The sustainability certification of bio-based chemicals within the EU is relatively robust, with 78% of identified producers applying certification. This figure drops to 55% among producers outside the EU, resulting in an overall certification rate of 65%. Cotton production is certified under a wide range of schemes, accounting for 27%, while other fibres and textiles, such as flax and jute, exhibit lower certification levels. For palm oil, certification is prevalent, especially for EU imports; conversely, certification for products like sugar, starch, and other oil crops is largely limited to biofuel production, where certification is mandated under EU sustainability transport targets.

3.2.3 Challenges in Data Accessibility and Monitoring

Quantitative data on certified bio-based production and trade remains scarce. Certification schemes generally publish lists of companies holding valid or withdrawn certificates but fail to provide data on certified production volumes or areas. This lack of clarity is compounded by the absence of systematic monitoring by EU trade authorities to record whether imported goods carry sustainability certifications. As a result, regional market and sector-level data on certification remain fragmented and insufficient for evaluating the effectiveness and transparency of CSLs.

3.2.4 Importance of Quantitative Data

Adequate and accessible quantitative data is essential for enhancing the effectiveness, transparency, and robustness of CSLs within the EU bioeconomy. Such data facilitates testing hypotheses for certification standard changes, predicting outcomes, identifying patterns, and informing decision-making and policy development. The HARMONITOR project underscores the significance of quantitative data by analysing trade flows, both certified and non-certified, and assessing the direct and indirect costs and benefits of certification (HARMONITOR's Deliverable D3.5 'Trade Flows Synthesis').

To support transparency and accessibility, the project developed an online trade flow tool embedded within the HARMONITOR website. This tool enables users to filter data across

various value chains, view individual trade flows between countries, and examine total imports and exports for specific countries.

3.3 Assessment and Monitoring of Certification Schemes and Their Performance

There is a large number of CSLs from different sectors that are relevant to the EU bioeconomy, covering both innovative and established bio-based value chains. These schemes adhere to internationally recognized standards, such as ISO guidelines, ensuring credible and consistent sustainability claims. CSLs adopt third-party verification and include detailed methodologies to address sustainability criteria, assurance mechanisms, and governance frameworks. However, information about governance systems often remains dispersed across multiple documents, creating challenges in accessing complete and transparent data.

The HARMONITOR project has developed two tools for assessing and monitoring CSLS

- The Comparative Benchmarking Tool.

- The Outcome Level component of the BiobasedCert Monitoring Tool.

3.3.1 The Comparative Benchmarking Tool

The Comparative Benchmark Tool (CBT), developed by Preferred by Nature, has served as a key instrument for evaluating CSLs in HARMONITOR's Work Package 4. It analyses their performance based on criteria spanning economic, social, and environmental sustainability, as well as assurance and governance systems. These evaluations highlight both strengths and areas requiring improvement.

- **Economic Sustainability.** Most CSLs show strong capabilities in ensuring legal compliance, providing comprehensive frameworks that require adherence to applicable laws and regulations. Land tenure and management rights are protected under procedures for securing land rights and implementing Free, Prior, and Informed Consent processes. However, gaps persist in key areas, including partial coverage in contract management, with insufficient requirements for contractual obligations between operators and suppliers. Additionally, corruption prevention and conflict of interest management are only partially addressed.

- **Social Sustainability.** CSLs effectively uphold human rights standards, worker safety, gender equality, and prevention of child labour and discrimination. Workplace health and safety are consistently prioritised, though significant deficiencies remain regarding responsible remuneration and employer-provided housing. These areas require more comprehensive frameworks to ensure equitable practices.

- **Environmental Sustainability.** Environmental sustainability is a major strength across certification schemes, with efforts directed at ecosystem preservation, pollution control, and biodiversity protection. Nonetheless, significant gaps exist in climate change adaptation measures, including limited requirements for risk assessment and adaptation strategies.

- **Assurance.** CSLs generally provide good frameworks for auditor competence and impartiality, with ISO alignment. Implementation of stakeholder consultation varied in scope and rigor, with only a few schemes demonstrating comprehensive and thorough stakeholder consultation processes. CSLs typically lack requirements for

unannounced audits, which reduces the effectiveness of audits. Additionally, minimum content requirements for audit reports are often not addressed.

- **Governance**. Governance structures in CSLs generally ensure transparency and robust complaint handling, with publicly available requirements and well-developed accreditation systems. Legal compliance is typically strong, with schemes requiring adherence to national and international laws. However, some gaps exist, including inconsistent information availability, variable oversight performance reviews, and limited EU regulatory alignment. While schemes often provide clear procedures and frameworks for handling disputes, they need to strengthen their oversight and evaluation systems to fully meet international best practices.

- **Key Areas for Improvement.** The performance of certification schemes is constrained by several notable weaknesses, including insufficient focus on climate change adaptation, fair remuneration, fraud detection, oversight consistency, and EU regulatory alignment. Addressing these shortcomings will be crucial for enhancing the credibility and effectiveness of CSLs.

3.3.2 The BiobasedCert Monitoring Tool

To address challenges such as lack of transparency and fragmented governance, the BiobasedCert Monitoring Tool (BMT) was developed in collaboration with sister projects SUSTCERT4BIOBASED and STAR4BBS. The BMT consists of three distinct levels:

- **System Level (developed by STAR4BBS):** Focuses on governance, standard-setting, assurance, and traceability mechanisms, highlighting areas for improvement such as enhanced oversight and traceability.

- **Content Level (developed by SUSTCERT4BIOBASED):** Evaluates sustainability criteria across environmental, circularity, social, and economic dimensions, categorised as mandatory, basic, or advanced requirements.

- **Outcome Level (developed by HARMONITOR):** Assesses the effectiveness of CSLs based on measurable impacts, using a structured framework comprising categories, principles, criteria, and indicators.

The Outcome Level, developed by HARMONITOR assesses the effectiveness of a scheme's requirements and outcomes based on provided data and evidence from literature. This involves benchmarking, interviews with CSL owners, and structured analysis to evaluate whether CSLs yield positive, neutral, or negative impacts. Indicators were adapted to each CSL type (certification schemes or ecolabels), ensuring fair and relevant comparison. Testing revealed varied coverage of outcome-level indicators and impact monitoring practices. While CSLs generally strive for continuous improvement through standard updates informed by certificate holder performance, stakeholder input, and evolving policy priorities, ecolabels focus on hotspot analyses to target areas with the highest potential for environmental gains. Increasing attention is being paid to outcome monitoring, particularly regarding greenhouse gas emissions in supply chains, with some schemes integrating data verification into audit procedures. However, many CSLs report performance indicators (e.g. number of certified operators) rather than measurable sustainability outcomes. Data availability remains a key barrier, with single-crop or long-established schemes reporting more detailed progress than multi-crop schemes and ecolabels because of greater complexity and data gaps. Confidentiality concerns often limit analytical depth, especially in areas with few certificate holders. Regular evaluation of long-term sustainability impacts also remains limited.

Independent studies are typically restricted to specific commodities and geographical areas or larger, more established schemes. Recommendations include investing in digital infrastructure, strengthening data-sharing mechanisms, and collaborating with research institutions and NGOs to enhance the measurement and communication of sustainability impacts.

The BMT's Outcome Level is structured around a hierarchical framework comprising categories, principles, criteria, and indicators for evaluating CSLs. The core framework includes two categories, five principles, and twenty-four indicators. The two main categories are:

1. **Measurable progress of operators**: This category focuses on the systematic approach of certified operators to address key sustainability issues and demonstrate measurable progress toward clearly defined sustainability objectives over time.

2. **Measurable progress of the CSL**: This category includes principles such as impact monitoring of the scheme, procedures to validate impacts, reporting or demonstration of impacts, and continuous improvement of the scheme.

The BMT's Outcome Level evaluation mechanism employs qualitative assessments, ensuring nuanced and adaptable results. Recommendations for future iterations include incorporating optional add-on indicators to address emerging sustainability priorities.

3.4 Evaluating the Feasibility of Certification Schemes

3.4.1 Assessing Costs and Benefits of Certification Schemes

Evaluating the feasibility of CSLs is essential to inform effective policymaking. This requires looking at financial, market, governance and institutional aspects of feasibility, where the financial dimension must encompass not only economic factors but also the (monetary) value of environmental and social dimensions. The latter often presents significant challenges in quantification. Currently, notable knowledge gaps persist regarding the costs and benefits of specific CSLs across various sectors, products, and lifecycle stages, making comprehensive assessment imperative. Also, other aspects of feasibility have not been systematically assessed (see Section 3.4.3).

HARMONITOR sought to address this challenge by conducting cost-benefit analyses and investigating the overall feasibility of CSLs. Costs associated with certification show considerable variation depending on the type of CSL, the company seeking certification, and the geographic region of operation. Similarly, the benefits of certification fluctuate based on local contexts, the stringency of standards, and the patterns of certification adoption. While certification often entails upfront costs, its long-term advantages—such as enhanced market access and improved sustainability outcomes—frequently outweigh these expenditures. A key challenge for data collection was the reluctance of companies to share sensitive economic information. Many organisations do not systematically collect such data, leading to persistent gaps in information that hinder robust analyses. Addressing these challenges will require a concerted effort to anonymise data collection, foster trust among stakeholders, and explore alternative methods for acquiring relevant information. Furthermore, CSLs can significantly contribute to ensuring transparency and presenting actionable insights through tools such as the BMT.

3.4.2 Understanding Externalities

Externalities, defined as the unintended positive or negative consequences of economic activities, are critical to understand when aiming for a sustainable bioeconomy. To date, comprehensive assessment of the EU bioeconomy's overall environmental externalities, including those that occur outside the EU, and of the monetary value of these externalities are lacking. Incorporating these externalities into economic assessments is vital for fostering sustainable economic models.

The HARMONITOR analysis on environmental externalities (Deliverable D6.2) finds that the EU bioeconomy drives significant shares of greenhouse gas emissions (including land use change), land use and water use both inside and outside the EU. This emphasizes the need to govern the impacts of bioeconomy more. Accurate evaluation of externalities was shown to present significant challenges, including limited data availability on international trade of biological resources and bio-based products as well as their certification status, and the effectiveness of certification to address environmental impacts. Strengthening existing monitoring systems for bio-based commodity trade flows presents a valuable opportunity to enhance transparency and understand the effectiveness of CSLs. By leveraging tools such as the BMT, these improvements could foster deeper insights into the impacts of the EU bioeconomy and advance research on trade dynamics. Greater accessibility to robust data would not only aid in assessing the role of CSLs in mitigating sustainability challenges but also promote informed policymaking and innovative solutions within the trade sector.

3.4.3 Barriers and Feasibility of Certification

The feasibility and impact of certification schemes are highly context-dependent, varying across market conditions, environmental considerations, governance structures, and policy support mechanisms. Successful CSL implementations are typically underpinned by strong market demand, cost-effective enforcement strategies, and regulatory incentives. However, the persistent challenge of data scarcity highlights the need for enhanced performance monitoring systems and refined assessment methodologies.

The feasibility of certification schemes is often constrained by a range of barriers, which can be categorised into four primary types:

- **Financial Barriers:** Certification costs, including audit fees and compliance expenses, can be prohibitively high, particularly for smallholders and companies in low-income regions. These stakeholders often lack the resources to invest in training, improved practices, and sustainable measures necessary for certification.

- **Market Barriers:** Limited demand for certified products and the absence of price premiums poses significant challenges. When certified goods are sold as conventional good, producers do not receive additional compensation, reducing the financial viability of certification.

- **Operational Barriers:** Bureaucratic requirements, coupled with limited education and technical knowledge among producers, often hinder compliance. For example, many farmers lack the expertise to implement advanced agricultural practices essential for meeting certification standards.

- **Governance Barriers:** The application of certification requirements across diverse local contexts can be problematic. Internationally standardised guidelines may not align with national or regional realities, creating difficulties in adherence. Additionally,

the proliferation of certification schemes without harmonisation can lead to confusion and doubts regarding their credibility and effectiveness.

To overcome these barriers, a multi-faceted approach is required. This includes providing financial assistance, implementing policies to stimulate demand for certified products, offering training and technical support to producers, and ensuring that certification standards are adapted to local contexts through inclusive stakeholder engagement. Greater collaboration among CSLs, policymakers, and research institutions will be instrumental in refining methodologies and advancing the overall effectiveness of certification schemes.

4 Collaborative Roundtable Platform

4.1 Fostering Collaboration to Advance Certification

The bioeconomy encompasses a diverse array of sectors, underscoring the critical role of CSLs in supporting policy objectives while addressing varied market and stakeholder demands. To facilitate meaningful collaboration and continuous improvement, the HARMONITOR project, with help from its sister projects, established a dedicated Roundtable Platform for CSLs and relevant stakeholders. This initiative aims to foster harmonisation, enhance transparency across bio-based value chains, and promote best practices. The Roundtable Platform has been thought to capture the dynamic development of CSLs, help them find commonalities and cooperation when operating in bio-based value chains within and across EU borders. the roundtable has continuously initiated interaction between CSLs, certification bodies, science, industry and policymakers to identify upcoming trends, options for standard improvement and to discuss future policy objectives. Figure 1 shows the organisations currently involved in the Roundtable Platform.

Figure 1. Organisations Participating in the Roundtable Platform.

Regular meetings throughout the project have demonstrated strong engagement and value for participants, with members expressing clear interest in continuing the Roundtable Platform beyond the project's official end.

4.2 Objectives of the Roundtable Platform

The Roundtable Platform serves as a participative review forum designed to:

- Promote collaboration among CSLs and stakeholders.

- Advance understanding of CSLs' strengths and limitations in co-regulation contexts.

- Encourage transparency and harmonisation across bio-based value chains.

- Facilitate the exchange of information and promotion of effective methodologies.

4.3 Structure and Activities

The Platform comprises two main components:

- **Platform Events:** These events facilitate communication, dissemination, and co-creation, presenting results, engaging stakeholders, and contributing to the development of tools such as the BMT. Key events included discussions on certification trends, policy developments, and the functionality of the BMT.

- **Roundtable for CSLs:** This dedicated forum encourages structured yet informal dialogue among CSLs, policymakers, and other stakeholders. Topics of discussion included emerging policy trends, sector-specific challenges, and strategies for long-term collaboration.

Notable events included in-person meetings in Brussels, discussions with EU Commission departments, and workshops exploring sustainability certification's role in policy frameworks. These events have demonstrated strong engagement and value for participants, with members expressing clear interest in continuing the Roundtable Platform beyond the project's official end.

4.4 Key Outcomes and Impacts

The Roundtable Platform achieved several significant outcomes:

- **Stakeholder Engagement:** Interaction with over 14 CSLs and multiple EU policy representatives strengthened the platform's relevance and legitimacy.

- **Methodological Advancements:** Feedback from participants directly enhanced criteria, indicators, and usability of the BMT.

- **Policy Integration:** High-level discussions highlighted CSLs' potential as co-regulation tools within EU bioeconomy policy frameworks.

- **Sustainable Continuation:** Plans are underway to institutionalise the Roundtable Platform, including the establishment of a secretariat for ongoing collaboration.

5 Recommendations for Continuous Improvement

5.1 Closing Policy Gaps

- **Defining clear sustainability ambitions is an essential step in improving the efficacy of CSLs.** EU policy must establish comprehensive sustainability goals that encompass environmental, social, and economic dimensions while incorporating concepts such as cascading utilisation and circularity. Setting precise sustainability targets within bioeconomy policies is vital to eliminating ambiguities and strengthening the integration of CSLs with broader frameworks.

- **Clarifying legislative requirements is another key area for enhancement**. Policymakers should provide detailed guidelines for the implementation of CSLs, ensuring their alignment with anticipated legislative mandates. This includes defining minimum thresholds and requirements to aid practitioners in adapting their operations to future-proofed standards. Furthermore, harmonising sustainability requirements across sectors is critical for maintaining coherence in governance, creating a level playing field for different sectors, and ensuring companies operating in different sectors can more easily and consistently meet requirements. Such efforts will mitigate conflicting objectives and prevent market distortions, thereby offering clarity to producers, procurers, and the general public regarding sustainability criteria.

- **Advocating for the integration of credible CSLs into national and international policies can contribute to bolster their legitimacy and effectiveness.** Collaborative efforts between policymakers, CSLs, and research institutions can refine methodologies and address existing gaps, such as the inclusion of social criteria like fair wages and safe living conditions for workers. Policymakers should strengthen and harmonise policy requirements to ensure that only robust and credible certification schemes are recognised in public frameworks. This entails establishing ambitious and consistent minimum standards for both sustainability criteria and assurance processes.

- **CSLs must engage continually with policymakers and other stakeholders to align their objectives with public policy priorities.** Collaborative initiatives such as the Roundtable Platform developed and promoted by HARMONITOR provide an excellent opportunity for structured dialogue to co-develop strategies that enhance the role of certification in sustainability governance. Industries also bear responsibility in this endeavour; prioritising credible and ambitious certification schemes, even when not mandated by regulation, is critical in maintaining the integrity of sustainability claims and promoting higher standards across the sector.

5.2 Developing Standardised Metrics

- **Standardised metrics play a crucial role in establishing transparency and accountability within sustainability efforts.** Metrics should reflect external costs and benefits, including greenhouse gas emissions, water use, and social impacts, allowing for a comprehensive evaluation of the implications of bio-based production and policies.

- **Integrating certification requirements into procurement criteria has proven effective in fostering market incentives for producers.** When certifications are

embedded within public procurement practices, it is imperative for policymakers to ensure that the recognised certification schemes are robust, credible, and capable of delivering meaningful sustainability outcomes.

5.3 Improving Trade Data Availability and Accessibility

- **Promote transparent data collection and dissemination for bio-based value chains through improved analysis of trade flows and precise quantification of certification impacts.** Policymakers should incentivize systematic tracking of bio-based product trade flows while collaborating with customs authorities and statistical agencies to introduce differentiated HS/CN codes for bio-based products. Incorporating bio-based content and certification details into trade and shipment documentation would enhance the reliability and accessibility of data, benefiting industries and countries, as well as improve future assessments of the role of certification and its effectiveness.

- **Address data gaps in trade statistics by distinguishing drop-in bio-based products and improving details on waste and residues.** The absence of trade data for drop-in bio-based products and waste streams highlights the need for additional CN codes to accurately differentiate between bio-based and fossil-based trade. Enhanced statistical categorization is vital for capturing smaller trade volumes and clarifying discrepancies, such as those observed in sugar trade data. Bilateral asymmetry evaluations should continue to assess the quality of trade statistics and encourage responsible authorities to refine data collection methods.

- **Enhance the accessibility of bio-based trade data for broader audiences, ensuring usability beyond expert circles.** Platforms such as Comext and UN Comtrade remain challenging for non-specialists, necessitating initiatives by the European Commission and United Nations to simplify access. Collaborative efforts like those by the HARMONITOR Consortium should focus on maintaining and updating trade flow tools regularly, provided sufficient funding is secured for these activities.

- **Increase the availability of market data on bio-based chemicals by facilitating publicly accessible studies supported by governmental organisations.** With the lack of statistical and market data due to paywalls, periodic expert studies tendered by the European Commission or JRC are recommended to provide updated insights into the EU market for bio-based chemicals. Public reports on market trends and production capacities should be made available to stakeholders to encourage broader participation and transparency.

- **Support certification schemes to publish detailed information regarding the volumes and origins of certified bio-based products.** Scheme owners and certificate holders should collaborate to enhance data visibility, following successful examples like the Textile Exchange platform. Joint efforts under alike projects could further establish detailed tracking frameworks to ensure comprehensive certification transparency across sectors.

- **Develop a centralized database for certified bio-based products, modelled after the Union Database (UDB) for biofuels.** Including bio-based products in the UDB could streamline data reporting and incentivize voluntary participation through regulation or market-based incentives. Lessons from the design and operation of the

UDB should inform the development of similar systems for bio-based chemicals and products.

- **Allocate resources for ongoing research to address data uncertainties and broaden the scope of certification studies.** Projects like HARMONITOR should continue to refine sustainability evaluations and expand data collection methodologies to include a wider range of bio-based products. Policymakers and research institutions must collaborate to support these efforts, ensuring the generation of reliable, publicly accessible insights into the certification landscape.

5.4 Enhancing Transparency and Stakeholder Engagement

- **Certification schemes should ensure the availability of comprehensive information online.** Relevant details about the development and content of the scheme, governance processes, evaluation methods, and impact assessments must be freely accessible. Transparency in publishing audit results, progress reports, and impact evaluations helps foster trust and credibility among all stakeholders.

- **Strengthen stakeholder consultation processes to improve transparency and responsiveness.** Certification schemes should formalize regular consultations with local communities, civil society organisations, and industry experts to address the needs of those impacted by certification activities. Stakeholders' participation ensures that schemes are inclusive and responsive. A prerequisite for this to work is recognizing and addressing power and resource asymmetries across different stakeholder groups.

- **Actively incorporate stakeholder feedback into certification standards and processes.** Scheme owners should refine standards using input from various stakeholders and clearly communicate the criteria and thresholds for compliance evaluation. Emphasizing participatory approaches ensures alignment with sector-specific nuances and relevance.

- **Expand efforts to engage diverse stakeholders in the development and revision of certification standards.** Collaboration involving local communities, policymakers, civil society, and industry experts ensures that the standards are comprehensive, widely accepted, and reflect the perspectives of all parties involved.

5.5 Encouraging Collaboration and Performance

- **Foster collaboration and partnerships to harmonize standards and maximize the effectiveness of CSLs.** Strengthening collaboration between different CSLs, industry associations, and governmental bodies is essential to align efforts and reduce redundancy. Partnerships across sectors can lead to the development of more comprehensive and impactful certification frameworks.

- **Align CSLs with international standards and best practices.** Ensuring that CSLs are in harmony with globally recognized standards (e.g., the ISEAL credibility principles) facilitates mutual recognition and acceptance across regions and industries. This alignment enhances the credibility and international outreach of CSLs, making them more effective in addressing sustainability challenges on a global scale.

- **Leverage advanced technologies to improve traceability and monitoring.** The adoption of modern technologies such as blockchain, remote sensing, and mobile applications is vital to enhance the accuracy, efficiency, and accessibility of CSL processes. Technology-driven solutions can significantly improve the transparency and reliability of traceability systems.

- **Increase capacity building initiatives to improve compliance and performance.** Providing targeted training and resources to certified operators helps them better understand and meet the requirements of CSLs. Capacity-building measures such as workshops, online courses, and technical assistance contribute to strengthening the operational capabilities of stakeholders involved in certification schemes.

5.6 Enhancing Robustness, Transparency, and Inclusivity of Certification Schemes

- **Develop robust monitoring and evaluation mechanisms.** CSLs should implement comprehensive monitoring systems to assess the effectiveness and impact of their processes. This includes regular audits, third-party verifications, and the integration of advanced data analytics to track progress and identify areas for improvement. Independent scientific monitoring and impact assessments would further enhance credibility and contribute to aligning certification standards with evolving policy goals.

- **Enhance transparency through accessible information.** CSLs must ensure that detailed information regarding their development, governance, evaluation methods, and impact assessments is freely available online. Transparency in publishing results, progress reports, and evaluations fosters trust and credibility among stakeholders, while enabling informed decision-making and public accountability.

- **Strengthen stakeholder engagement and consultation.** Formalizing regular consultation processes with local communities, civil society organizations, and industry experts is vital for ensuring inclusivity and responsiveness. Stakeholder feedback should actively inform the refinement of certification standards and processes, with clear communication of evaluation criteria to promote participatory approaches aligned with sector-specific needs.

- **Foster collaboration to harmonize standards and practices.** Encouraging partnerships between CSLs, industry associations, and governmental bodies will reduce redundancy and enhance the comprehensiveness of certification frameworks. Aligning CSLs with international standards and best practices ensures mutual recognition and supports global sustainability efforts.

- **Leverage advanced technologies for traceability and monitoring.** CSLs should adopt modern technologies such as blockchain, remote sensing, and mobile applications to improve the accuracy, efficiency, and accessibility of traceability systems. Technology-driven solutions contribute to transparency and reliability, enabling better compliance across supply chains.

- **Increase capacity-building initiatives for stakeholders.** Targeted training, workshops, online courses, and technical assistance should be provided to certified operators. These initiatives strengthen the operational capabilities necessary to meet certification requirements and enhance long-term compliance and performance.

- **Support smallholder inclusion in CSLs.** Tailored programs, group certification options, and financial assistance should be implemented to empower smallholders to meet certification standards. This inclusive approach reduces barriers and enables small-scale operators to contribute to deforestation-free and sustainable practices.

- **Promote regular reviews and international collaboration.** CSLs should develop mechanisms to continuously review and compare performance, assurance systems, and governance structures. These reviews should inform policy development and address gaps in sustainability certification, leveraging insights from international networks and multi-stakeholder platforms.

- **Prevent the mixing of non-compliant materials in supply chains.** CSLs must establish controlled mass balance models and due diligence systems to ensure that only compliant commodities reach markets, particularly those governed by strict regulatory requirements such as the EU Deforestation Regulation.

- **Promote continuous improvement through collaborative platforms.** CSLs should actively participate in multi-stakeholder organizations and voluntary self-evaluation tools, such as the BMT framework. Collaboration with industry associations, standardization bodies, and NGOs would further refine standards and practices, ensuring alignment with global sustainability priorities.

5.7 Improving Key Areas of Schemes Underperformance

- **Address climate change adaptation measures.** CSLs should develop robust frameworks guiding certified entities in identifying risks and implementing strategies. This includes promoting changes in crop practices, water management, and soil conservation techniques to better prepare for shifting weather patterns and other climate impacts.

- **Strengthening corruption prevention and conflict of interest management is imperative for maintaining certification integrity.** CSLs must implement stringent anti-corruption measures, such as mandatory disclosures, conflict-of-interest policies, and regular audits to detect and prevent unethical practices.

- **Improving responsible remuneration and employer-provided housing standards is crucial.** CSLs should establish guidelines for fair wages, including living wage benchmarks, and enforce standards for employer-provided housing to ensure workers live in safe, hygienic, and adequate conditions.

- **Incorporating criteria for recycled materials and risk-based sourcing is recommended to address sustainable sourcing strategies.** CSLs must verify the recycled status of materials and systematically identify, assess, and mitigate sustainability risks in sourcing practices.

- **Enhancing accreditation, oversight, and monitoring mechanisms is vital for ensuring long-term compliance and effectiveness.** CSLs should adopt regular external audits, follow-up evaluations, and comprehensive frameworks for ongoing monitoring and evaluation of certified entities.

- **Aligning standards with EUDR requirements is essential.** CSLs should update their frameworks to include geolocation data, thorough risk assessments, and chain-of-custody models to ensure deforestation-free production and compliance with the regulation.

- **Supporting smallholder inclusion must remain a priority.** CSLs should provide group certification, tailored programs, and financial assistance to empower smallholders in meeting certification standards and complying with EUDR requirements.

- **Preventing the mixing of non-compliant materials without additional checks in the supply chain is necessary.** CSLs should establish controlled mass balance models and due diligence processes to ensure that only deforestation-free commodities reach markets, particularly within the EU.

- **Streamlining stakeholder consultation processes to ensure transparency and responsiveness.** CSLs must formalize regular consultations with local communities, civil society, and industry experts to address the needs of those impacted by certification activities.

- **Implementing robust traceability systems improves commodity sourcing and prevents deforestation.** CSLs should adopt geolocation-based traceability and tamper-proof technology to provide third-party verifiability.

5.8 Using Support Evidence-Based Approach About Benefits of Certification

- **Strengthen evidence-based approaches to assess the benefits of certification.** It is essential to conduct further research to identify effective support mechanisms, incentives, and motivations for companies to monitor and collect data on the costs and benefits of certification, particularly regarding social impacts. Such analyses should inform the design of targeted policies to maximise the positive outcomes of certification frameworks.

- **Standardise and expand data collection on environmental and social impacts.** Policymakers should advocate for consistent and transparent data provision across value chains to address the barriers posed by limited availability and standardisation. Such efforts would enable comprehensive analyses of cost internalisation and drive informed legislative developments and CSLs improvements aiming at enhancing the environmental and social impact of certification.

- **Introduce EU-wide measures to support sustainable market transitions.** Mandatory procurement quotas, differentiated VAT rates, and environmental levies on unsustainable products could serve as effective tools for encouraging market shifts toward sustainable alternatives. These measures must be coupled with provisions to mitigate disproportionate impacts on smallholders and companies in low-income countries, ensuring equitable access to certifications and markets.

- **Enhance support for smallholders and economically disadvantaged companies.** Policymakers should actively promote the inclusiveness of these stakeholders in certification processes. Similarly, downstream companies can utilise their market power to provide training, co-invest in infrastructure, or establish long-term purchasing agreements that facilitate certification for smallholders. CSLs should simplify requirements and develop user-friendly systems to reduce administrative burdens, while certification bodies should adopt cost-effective IT tools to streamline processes and improve access.

- **Invest in methodologies to comprehensively capture social impacts.** Enhanced research approaches are required to evaluate labour conditions, land management practices, cultural heritage preservation, and health and safety impacts within certification systems. Understanding these factors is fundamental for designing frameworks that ensure also social sustainability throughout the value chain.

- **Promote harmonised information collection on sustainability impacts.** Policymakers should implement regulations that mandate the collection of reliable and standardised data on the socio-economic and environmental performance of CSLs. Researchers must also investigate the broader impacts of certification to provide empirical insights, while CSLs should establish monitoring systems that effectively assess their outcomes and contributions.

5.9 Maintaining and Strengthening the Roundtable Platform

- **Use the Platform to foster continuous improvement.** It is recommended that CSLs adopt a culture of regularly updating their standards and practices. This can be achieved by conducting periodic reviews through the Roundtable Platform, engaging in stakeholder consultations, and incorporating best practices from other successful schemes and new scientific insights.

- **Maintain the Roundtable Platform as a collaborative initiative capturing the dynamic development of CSLs.** The Roundtable Platform should encourage harmonisation and continuous improvement through active information exchange and the promotion of best practices among stakeholders.

- **Maintain the Support of Roundtable Platform Members.** The continuation of the collaborative Roundtable Platform is strongly supported by its members, who recognise its instrumental role in fostering dialogue and cooperation. It is recommended that various options, such as a co-ownership model for CSLs, be explored to ensure its sustainability and effectiveness in policy and market integration within sustainability certification frameworks.

- **To strengthen policy alignment and harmonisation efforts, it is recommended that the Roundtable Platform provide a neutral and structured space for exchange.** This initiative has great potential to advance mutual recognition and continuous improvement of sustainability certification schemes within the bioeconomy.

- **In the short term, HARMONITOR partner DBFZ will continue to coordinate the Roundtable Platform.** This coordination should focus on logistical aspects such as meeting organisation, agenda development, and facilitation. Additionally, a follow-up in-person event should be hosted in December 2025, building on the success of the previous gathering held in Brussels in December 2024. This event will serve to maintain momentum and explore further collaboration opportunities between CSLs and EU policymakers.