



HARMONITOR

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D6.1

Online database with (in)direct costs and benefits

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REPORT

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TABLE OF CONTENTS

1	Executive Summary	4
2	Introduction	5
3	Methodology	6
3.1	Quantifying direct cost of certification.....	6
3.2	Quantifying indirect costs and benefits of certification	7
4	Findings	8
4.1	Database with (in)direct costs and benefits of certification	8
4.2	Direct costs	8
4.2.1	Cost categories and averages prices	9
4.2.2	Examples on different supply chain cost items.....	10
4.2.3	Influencing factors.....	11
4.3	Indirect costs.....	12
5	Conclusions	17
6	References	19
7	Appendices	23
7.1	Database	23
7.2	Glossary	23
7.2.1	Definitions and explanations – direct costs	23
7.2.2	Definitions and explanations – Indirect costs	24

1 Executive Summary

Deliverable 6.1 presents a database of direct and indirect costs and benefits of sustainability certification for the bioeconomy. This report provides an overview of the methodology applied to collect data on direct and indirect costs and benefits, and summarizes key findings. This report accompanies the actual database, which is available in [the Appendix](#).

Direct costs of certification

The collection of the direct cost data (Task 6.1) revealed several challenges in obtaining the data. The main challenge was due to the fact that the cost items definitions that the various certification schemes and labels (CSLs) operate with are not aligned across. Likewise, the certification bodies (CBs) are also using separate accounting procedures. It was, however, possible to identify cost categories such as application fees, auditing costs, and administrative expenses.

By establishing a standardised framework for cost categorisation, it becomes easier to compare and collect direct cost data from different schemes. This mapping exercise resulted in providing an option to compare the nuances of cost structures within different schemes and inform efforts to streamline and harmonise them. Through this, the results can facilitate a more structured approach to collecting direct cost data across certification schemes, ultimately enhancing transparency, comparability, and efficiency in cost management within the certification industry.

Indirect costs and benefits of certification

As for the indirect costs and benefits (Task 6.2), the findings from the analysis of scientific literature indicate that overall the economic impacts of certification are investigated more than the social ones. Additionally, literature mainly focuses on feedstock producers and less on the rest of the supply chains. According to literature, certification typically has positive effects on certified farms or companies, even though it often leads to higher costs. However, some entities, especially smallholders and businesses in low-income countries, experience no or negative impacts due to high costs and challenges in meeting certification requirements.

To support smallholders, financial assistance from external organizations and governments is essential. Certification scheme owners should provide tailored solutions for smallholders' challenges. European policy defining the role of certification in the bioeconomy and its detailed requirements for certification needs to consider mitigating negative impacts on smallholders and adapt to different contexts to protect local communities.

The social impacts of certification, such as labour conditions and access to healthcare and education, are more mixed and less studied across the supply chain. Moreover, different studies measure social impacts in varying ways, making comparisons across studies difficult. Future policies related to certification should also give more attention to social sustainability, as current regulations focus mainly on environmental and economic aspects, neglecting social indicators.

Overall, additional research should be conducted on the direct and indirect costs and benefits of certification, and the data should be collected and analysed in a more harmonised way across different studies. Key aspects to harmonise are the variables used to measure the impacts of certification, as currently they are measured in different ways in different studies. For instance, the impact of certification on education was measured by different indicators, e.g. years of schooling, child school attendance, and number of education facilities built in the certified area. Increasing harmonisation would facilitate comparisons and allow to draw

broader conclusions on the overall profitability of sustainability certification and the implications for entities in different contexts.

2 Introduction

Sustainability certification schemes and labels (CSLs) are guidelines that define a set of environmental, economic, and/or social requirements to enhance the sustainability of products or services (Edwards et al., 2012). Although CSLs are often voluntary market-based tools, their adoption as co-regulation instruments by governments across different sectors has been increasing over the past years (Gaebler, 2014). They already play a key role as a co-regulation instrument in bio-economy policies of the European Union (EU). For instance, the Renewable Energy Directive (RED, RED II, RED III) has set sustainability requirements for biofuels, bioliquids, and biomass for energy. In this context, certification schemes are used as instruments to prove compliance with those sustainability requirements (STAR-ProBio, 2020). Similarly, the EU Deforestation Regulation (EUDR) Regulation (European Parliament, Council of the European Union, 2023), which applies to soy, beef, palm oil, wood, cocoa, coffee, rubber and derivative products, prohibits imports and exports of products associated with deforestation and forest degradation. The regulation enables certification to be used for risk assessment and mitigation processes.

For the bioeconomy, the importance of ensuring sustainability of feedstocks and biobased products is recognised by producers, consumers, and policymakers alike, underscoring the necessity of comprehensively understanding the environmental, social, and economic implications associated with their production (Falcone and Imbert, 2019). Sustainability certification can be used to monitor and improve these aspects and communicate the sustainability of biobased products to consumers. To do so, it is important to ensure that certification both improves the sustainability of products and is economically feasible for the companies that want to get certified or include certified products in their supply chains.

Economic feasibility of CSLs is an important aspect influencing their uptake by companies. This is because certification needs to be economically profitable for companies to be competitive on the market. Economic feasibility is determined by the trade-off between the costs and benefits of getting certified. The costs and cost structure vary across different CSLs, but it generally consists of **direct costs** (certification fees, administrative fees, cost of audits) and **indirect costs** (costs to upgrade the management and production system to meet certification requirements) (Durst et al., 2006; Midderdorp et al., 2018; So et al., 2022). As a result of certification, **environmental, social, and economic benefits** are expected. For example, the environmental benefits include better soil quality, reduced deforestation, increased tree and animal diversity (Burivalova et al., 2017). The expected **economic and social benefits** consist of price premiums, increased market access, better public image, improved working conditions, reduced inequalities, and more (Camilleri, 2022; Chen et al., 2010; So et al., 2022). These benefits must outweigh the costs for certification to be feasible for companies. However, the overall feasibility still remains unclear.

For gaining a better understanding of the overall feasibility of sustainability certification, data is needed on the direct and indirect costs and benefits of sustainability certification. This data needs to be consistently collected, accounting for different conditions and certification setups. In the present deliverable, Deliverable 6.1, we present the direct and indirect costs and benefits data collected in HARMONITOR. The deliverable is an online database of direct and indirect costs, accompanied by the present report.

This deliverable is part of work package (WP) 6. The objective of this WP is to assess the direct and indirect costs and benefits of adopting sustainability certification schemes and

labels in selected industrial bio-based value chains, and to identify governance options for increasing certified production. Deliverable 6.1 combines data collected for Task 6.1 and Task 6.2. Task 6.1 aims at quantifying the direct costs of obtaining certification from selected CSLs. Task 6.2 quantifies costs and benefits of meeting sustainability criteria.

The present document details the methodology used for collecting data (Section 3), presents key findings from the data collection (Section 4), and draws conclusions (Section 5). The report is complemented by an appendix with a glossary of key terms and concepts used when discussing direct and indirect costs of sustainability certification, and the link to access the online database.

3 Methodology

3.1 Quantifying direct cost of certification

To quantify the direct cost of certification, the Task 6.1-partners gathered their first-hand information on the fees charged by them in their capacity as certification body (CB) to certified companies, also known as certificate holders (CHs). These fees are associated with receiving and maintaining the certification status of certificate holders.

Direct costs of certification include:

- Fees charged by the certification body to conduct the audit (including auditing/reporting, administration, expenses and technical review),
- Fees charged by the certification scheme owners, and
- Any fees for trademark usage incurred for expressing participation in a specific certification scheme.

The direct costs data were collected for, and then sorted by, the type of certification, supply chain element and region, as these factors influence the costs of auditing or certificate fees. This general information as well as the cost item categories that were collected are provided in Table 1.

Table 1: Overview of data collection on direct costs

General information	Direct cost items
CSL	Certificate fees
Group/individual certification	Annual membership fees (if applicable)
Region	Administration
Supply chain element	Auditing, reporting
Feedstock category	Technical review
Feedstock specific	Expenses
Size of farm (if supplier)	Fees for trademark usage (if applicable)
Annual biomass input (if processor, trader)	

Based on the comprehensive review of CSLs in WP2, the selection of CSLs for the direct cost estimation in Task 6.1 was narrowed down to nine CSLs. This selection was driven by the aim to represent the diversity of CSLs (including coverage of different feedstocks relevant for next analysis steps in WP6) and by consideration of the knowledge and first-hand information on auditing costs available through the HARMONITOR partners, including those not assigned to WP6. The collective expertise is predominantly guided by the partners' role as certification body for various schemes.

By leveraging the combined knowledge and expertise of the project partners, the selection process aimed to capture a well-rounded representation of aspects relating to the direct costs in line with the scope of Task 6.1 and the further use in WP6. The nine CSLs are:

- Forest Stewardship Council (FSC)
- Programme for the Endorsement of Forest Certification (PEFC)
- Sustainable Biomass Program (SBP)
- Rainforest Alliance (RA)
- Global G.A.P
- Roundtable on Sustainable Palm oil (RSPO)
- International Sustainability & Carbon Certification (ISCC)
- Sustainable Agriculture Initiative Platform (SAI)
- Sustainable Forestry Initiative (SFI)

By comprehensively covering direct costs aspects, the current selection allows catering to a very wide selection of schemes and their comparison. The approach allows additional CSLs to be added in the future. WP6 partners have been in contact with certification bodies and other experts in the sister projects to contribute to this.

3.2 Quantifying indirect costs and benefits of certification

The approach to assess *indirect costs and benefits* associated with meeting the sustainability criteria established by CSLs involves conducting a literature review on the costs and benefits of certification. The literature review focussed on agricultural and forestry products, with specific attention given to underrepresented and relevant feedstocks such as palm oil, natural rubber, soybean, sugar cane, wood, and raw cotton.

The review followed a systematic approach based on the PRISMA guidelines for systematic reviews (Page et al., 2021). Different scientific publication databases were scanned to find relevant studies. The eligibility of the studies was determined in two phases (scanning titles and abstracts, and full-text reading) based on a set of inclusion criteria:

- Peer-reviewed scientific papers (quantitative and qualitative original studies and review papers);
- Publications with main text in English (publications with title and abstract in English but main text in a different language were not included);
- Published between 2005 and 2023;
- Covering economic and/or social impacts of certification;
- Covering at least one of the selected feedstocks and/or related value chains (palm oil, maize, natural rubber, soybean, sugar cane, wood, raw cotton).

Both qualitative and quantitative papers were included, and relevant information was extracted. In particular, authors, publication year, study type, data collection and analysis method, covered regions, feedstocks, and more, was extracted and stored in a dataset for further analysis. Most studies examined the effects of certification on different variables, such as farm income, yields, production costs, input costs, workers' wages, and so on. These variables were aggregated into outcome categories. The economic outcome categories were cost, revenue, income, productivity, price, and market access. The social ones were education, health, poverty reduction, labour condition, and well-being.

The impacts of certification were reported differently in different studies. The quantitative studies often presented numerical values for outcome categories for certified and uncertified products; for instance, farm income reported for the certified farm and for a comparable uncertified one, used as a counterfactual. In these cases, the difference between the two values was used to determine whether certification entailed an increase, decrease, or no effect on the outcome category. Some qualitative studies also allowed to extract similar data; here, the impacts of certification on outcome categories were not reported numerically but were described in terms of increase, decrease, or no effects after certification. In these cases, they were treated as the quantitative ones and inserted in the dataset. The data inserted in the dataset were further analysed by determining how many observations reported an increase, decrease, or no impacts of certification for each outcome category.

4 Findings

4.1 Database with (in)direct costs and benefits of certification

The data on the direct and indirect costs of certification and the associated benefits were collected and organised in a database. The database is downloadable in [Section 7.1](#) of this report. The file is organised in 4 Excel sheets:

- Read_me: provides general information on the database and definitions of cost categories, as well as a brief description of how the data were collected.
- Direct costs calculator: contains a tool that allows to calculate the direct costs of certification for different combinations of CSL, supply chain element, region, individual or group certification, feedstock category, and feedstock.
- Direct costs: provides the data collected on the direct costs of certification
- Indirect costs, benefits: provides the data collected from scientific literature on the indirect costs of certification and certification benefits.

4.2 Direct costs

The process of collecting direct cost data uncovered several challenges in data acquisition, primarily stemming from discrepancies in the definitions of cost items employed by different CSLs and CBs, which operate with distinct accounting procedures. Despite these obstacles, key cost categories such as application fees, auditing costs, and administrative expenses were identified.

By implementing a standardised framework for cost categorization, the comparability and collection of direct cost data across various schemes have been significantly facilitated. This comprehensive mapping exercise has allowed for a nuanced comparison of cost structures across different certification schemes, serving as a foundation for efforts aimed at streamlining and harmonising these structures.

The insights gained from this process will contribute to a more methodical approach to collecting direct cost data within certification schemes, ultimately fostering enhanced transparency, comparability, and efficiency in cost management across the certification industry to the benefit of the users of certification schemes.

4.2.1 Cost categories and averages prices

The Task 6.1 data spreadsheet commenced with the ISCC scheme, which two of the Task 6.1 partners were very familiar with, and then additional rows and cost items were incorporated for the CSLs that were not adequately covered by the initial categories. An early observation from the data collection process was the distinct pricing structures deployed by different CSLs, posing challenges in comparing cost items across various schemes. Although definitive recommendations were premature at this stage, there was potential to align categories within certification to enhance comparability of costs and overall scheme characteristics. Table 2 provides an overview of the final categories of direct costs applied in the database.

Regarding data collection, initial discussions among Task 6.1 partners revolved around determining which group of stakeholders was required to obtain the desired information on direct costs. The Task 6.1 team decided early on against pursuing data directly from certificate holders due to perceived time and resource constraints. Another approach considered was approaching CSL owners to request information on costs charged to users of the certification schemes. However, it was unclear whether CSL owners possessed comprehensive information on the cost structures imposed by certification bodies on certificate holders. Concurrently, the Task 6.1 team comprised three certification bodies with access to the necessary information, albeit for a limited number of CSLs.

An important point of internal discussion among Task 6.1 partners was the confidentiality of cost data related to auditing fees. Direct cost information associated with certification is typically considered market-sensitive and not publicly disclosed by certification bodies. Consequently, the team opted to use ranges and average values instead of precise figures to estimate costs, aiming to maintain confidentiality while gathering direct cost data for the cost-benefit analysis.

A potential source of bias in validating the cost data stemmed from differences in CSL proliferation based on the number of certificate holders, with contributing partners certifying varying numbers of companies in their portfolios. Consequently, Task 6.1 established a minimum threshold for sample data, requiring contributing partners to certify at least ten companies for their data to be included in the database.

Table 2. Direct costs categories.

Category	Subject
Administration	Administration, Registration, Database Intro and associated costs
Auditing & reporting	Preparation for audit, undertaking of audit, and reporting of audit findings
Review	Technical review of audit report, incl. “four-eyes check”, and following preparation for issuance of certificate
Certification fees	CB: Annualised certification costs for the issuance of a certificate or Letter of Attestation
	CSL: Annualised – midsized companies
Travel expenses	Estimated average for travels within the country of origin for the auditor
	Estimated average for auditor travelling out of country of origin

4.2.2 Examples of different supply chain cost items

The following tables illustrate the various cost items used for the pricing structure of CSLs where Table 3 presents information for individual certification and Table 4 presents information for group certification. This is based on the items identified by the Task 6.1 partners.

Table 3: Average net prices for individually certified supply chain elements

Supply chain elements	Average net prices €						
	Adminis- tration (Flat Rate Ø)	Audit & Reporting (p.md)	Technical Review (p.md)	Certificate Fees (CB&CS) Ø	Expenses (own country) Ø	Expenses (abroad) Ø	TOTAL Ø
AGRICULTURAL SUPPLIER (individually certified, average crops and production size in the EU)	400	1200 (1 md)	600 (0.5 md)	900	250	n/a	3350
					n/a	950	4050
AGRICULTURAL SUPPLIER (individually certified, average crops – non-EU based supplier)	400	2400 (2 md)	600 (0.5 md)	900	n/a	950	5250
POINT OF WASTE & RESIDUE ORIGINATION (individually certified, bio & circular – all countries) EU & non-EU based supplier	400	1200 (1 md)	600 (0.5 md)	900	450	n/a	3550
					n/a	950	4050
PROCESSING PLANTS (no random sample, all countries)	400	2400 (2 md)	600 (0.5 md)	900	350,0	n/a	4650
					n/a	950	5250
TRADERS (no random sample, all countries)	400	1800 (1.5 md)	600 (0.5 md)	900	350	n/a	4050
					n/a	950	4650

n/a – not applicable, p.md – person month, md - month

Table 4: Average net prices for supply chain elements with group certification option

Supply chain elements	Average net prices €						
	Adminis- tration (Flat Rate Ø)	Audit & Reporting (p.md)	Technical Review (p.md)	Certificate Fees (CB&CS) Ø	Expenses (own country) Ø	Expenses (abroad) Ø	TOTAL Ø
GROUP CERTIFICATION (First Gathering Points, Farmer Groups – own country) Number of farms from 10-16 random sample: Four Farms to audit Region: EU	400	4200 (3.5 md)	600 (0.5 md)	900	450	n/a	6550
					n/a	950	7050
GROUP CERTIFICATION (First Gathering Points, Farmer Groups – abroad) Number of Farms from 10-16 Random Sample: 4 Farms to audit Region: non-EU	400	6000 (5 md)	600 (0.5 md)	900	-	-	-
					n/a	950	8850
COLLECTING POINT OF WASTE & RESIDUES	400	3600 (3 md)	600 (0.5 md)	900	450	n/a	5950

(Collecting Point, PoO Groups, bio & circular – all countries) Number of PoO from 10-16 (>120mt) Random Sample: 4 PoO to audit Region: EU & non-EU					n/a	950	6450
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n/a – not applicable, p.md – person month, md - month

4.2.3 Influencing factors

Task 6.1 identified several key factors driving the cost of certification; an overview of these factors is provided in Table 5. These are related to e.g., onsite auditing, which requires travel. Although the ability to conduct online audits following the COVID-19 pandemic has been on the rise, certain audit activities still require physical presence, impacting overall audit costs.

Another driver is the individual CSLs requirements for random sampling (e.g., farm audits, document checks, interviews), which lead to varying audit durations and costs. This is also related to the determination of risk levels by auditors or CSLs, which affects the overall workload. CSLs may have differing approaches to risk assessment, resulting in significant cost variations.

The location of CBs relative to the Certificate Holder (CH) influences cost calculations based on local wages and socio-economic conditions. CBs in countries with lower standards may offer lower costs and tariffs.

Factors mitigating the cost of certification can be recognition of EU standards and cross-compliance between CSLs that reduces audit durations and costs. CSLs accepting equivalency with other schemes are mostly rare, but this carries the potential to reduce the need for additional audits.

Table 5: Key factors influencing the direct costs of certification, their relevance and consequences

Factor	Relevance	Consequences
Onsite / Online	Following the COVID-19 Pandemic, online audits could be conducted, and this helped to certify clients in an extremely exceptional situation; with improved technical solutions, it still might be used in regular Audits (determined by CSL)	→ Online audits lead to lower, zero travel expenses etc. although it may limit the auditor's options when it comes to site review and other activities that can only be achieved by being on location.
Random Sample Definition & Selection	Depending on CSL requirements → influencing especially Audit man days (e.g., a random sample of farm audits, document checks, interviews, etc.)	different CSL approaches → significantly varying costs
Risk Level Application	Determination of Risk Level either done by the auditor or set by CSL → again does influence especially Audit person-days	Auditor overall approaches may be seen as quite similar; however, there are different CSL approaches (again, significantly varying costs).
Socio-Economic Standard of a Country & Registration/Operational	The location of a CB/VB is relevant for generating offers (considering average, local wages)	→ CB's located (and accredited) in countries with a lower socio-economic standard (e.g., SEA, SA, Africa) do have lower costs per man day compared to a CB located in e.g., EU or Northern America, etc.; → hence,



Address of a CB/VB		they may also offer lower tariffs compared to above-mentioned locations in EU, etc.
EU / Non EU	Relevance, especially for recognition of social, economic- and agricultural standards – for agricultural suppliers a key factor is the European Cross Compliance CC (Good Agricultural Practice on EU Level, basic requirements to claim EU subsidies)	→ quite a view CSL do recognise active CC participation of farms, so that the Audit Requirements may already recognise some parts of the CC → reduced audit duration.
Potential Benchmarking & Recognitions	If the CSL already have some kind of Benchmarking System, it will be part of the System Documents → does determine whether other CSLs with similar requirements may be seen as equivalent.	→ a System User may e.g. make use of a local CSL (and has that one already implemented); that System User does not need an additional Audit & Certificate if the benchmarking process is completed and if the local CSL is recognised by e.g. an international CSL.
Points of Origin (Waste & Residues) and Audit timing	Different kinds of Points of Origin also need different times to audit (e.g., Restaurants, Processing Plant – Food/Feed Industry, Municipal Collecting Points, Public Containers, Palm Oil Mills, Rendering Plants, etc.)	→ A specific subcategory in table above was not explicitly considered, but only a useful average assumed.
Implication of Product Certification vs. System Certification	a) Product Certification: all supply chain elements have to be certified (from feedstock producer to producer of final material – including traders and storage providers) → any biomaterial-related claim is strictly related to product batches (mainly for co-regulated systems) b) System Certification: there is no requirement for certifying all supply chain elements; it would potentially be possible to take just one of the elements (e.g. biomass processor) to somehow include supply chain information and data into the scope of certification → any biomaterial related claim to product batches are not possible, however, a general statement may be made (mainly unregulated approaches).	a) Product Certification: looking at the final product, it has to be considered that all direct certification costs of all certified supply chain elements have to be considered respectively summarised b) System Certification: looking at the final product, it may be considered that potentially only at one supply chain element certification costs arise – hence, these would be the only ones along the entire supply chain in this case.

4.3 Indirect costs

The indirect costs of certification were collected through the analysis of scientific literature. The research was also used to write a scientific article, which was submitted to a scientific journal on the 19th of February 2023. The quantitative information collected from literature are available in the dataset associated to this report, while the current section provides an analysis of the data.

The indirect costs of certification were measured in diverse ways in different papers. The outcome categories as they were examined in the original studies as well as how they were aggregate for the current report are presented in Table 6. In addition to information on the indirect costs, also data on the benefits of certification were collected.

Table 6. Matching outcome categories of the original studies with those used in the current report. The last column shows the references of the studies treating each outcome category.

Outcome category	Outcome categories as presented in original study	Studies
Direct cost	Certification fee, pre audit cost, main audit cost, training of managers cost, cost of acquiring documentation, cost for group certification documents, internal assessment cost, membership registration cost	Aisyah et al., 2021; Frey et al., 2021; Hidayat et al., 2016; Hutabarat et al., 2018; Purbasari et al., 2020
Indirect cost	Cost certified crop, fertilizer cost, pesticide cost, group member trainings cost, investment costs, labour cost, operating costs, production cost, weighing and transport of harvest cost, Incident Command System establishment cost, Incident Command System training cost	Aisyah et al., 2021; Cox et al., 2018; Hidayat et al., 2016; Hutabarat et al., 2018; Meemken, 2020, 2021; Oya et al., 2018; Reddy et al., 2022; Tey et al., 2022
Productivity	Changes in management practices, Fresh Fruit Bunch (FFB) production, FFB yield, productivity, stability of production, yield	Blockeel et al., 2023; Brako et al., 2022; Chalil et al., 2020; Cabbage et al., 2010; Furumo et al., 2020; Hutabarat et al., 2018; Meemken, 2020, 2021; Morgans et al., 2018; Oya et al., 2018; Reddy et al., 2022; Rodhiah et al., 2019; Tey et al., 2021; Traldi, 2021
Revenue	Farm revenue; farm sales, FFB sale, gross revenue, partial returns, revenue from certified crop sale, total FFB revenue	Bok et al., 2022; Cox et al., 2018; Fikri et al., 2022; Frey et al., 2021; Hidayat et al., 2016; Hutabarat et al., 2018; Kato et al., 2020; Meemken, 2020; Reddy et al., 2022; Wolff et al., 2022
Income	Income, income from certified production, market mechanism, net revenue, profit (gross revenue-costs), household income, WATP (willingness and ability to pay), Net Present Value, value creation	Aisyah et al., 2021; Bok et al., 2022; Brako et al., 2022; Burivalova et al., 2017; Dompreeh et al., 2021; Hidayat et al., 2016; Humphries et al., 2006; Hutabarat et al., 2018; Kato et al., 2020; Meemken, 2020; Mook et al., 2018; Morgans et al., 2018; Oya et al., 2018; Purbasari et al., 2020; Reddy et al., 2022; Santika et al., 2021; Schleifer et al., 2020; Tey et al., 2022; Traldi, 2021; Vogt et al., 2022; Wolff et al., 2022
Market access Price premium	Market access, market performance, positional advantage, stability of market FFB price, price premium, selling price	Blockeel et al., 2023; Burivalova et al., 2017; Fikri et al., 2022 Burivalova et al., 2017 ; Chalil et al., 2020 ; Hutabarat et al., 2018 ; Meemken, 2021 ; Meemken et al., 2018 ; Oya et al., 2018 ; Tey et al., 2022 ; Wolff et al., 2022
Health	Child mortality, food security , health facilities, illness, nutrition, workspace safety and health provisions	Blockeel et al., 2023; Brako et al., 2022; Lee et al., 2019; Morgans et al., 2018; Oya et al., 2018; Schleifer et al., 2020
Education	Child school attendance, number of educational facilities, years of schooling	Brako et al., 2022; Lee et al., 2019; Oya et al., 2020
Poverty reduction	Reduced number of poverty letters, poverty incidence	Meemken, 2020; Santika et al., 2021

Labour condition	Employment relations, number of workers, worker salary	Blockeel et al., 2023; Furumo et al., 2020
Well-being	Access to basic needs, households assets, capacity development, conflict resolution, gender equality, perception/satisfaction, reduced water and land grabs, power dynamics, social mechanism, social network	Blockeel et al., 2023 ; Dompok et al., 2021; Forrer and Mo, 2013; Meemken, 2021; Meemken et al., 2018; Mook et al., 2018; Morgans et al., 2018; Oya et al., 2018; Santika et al., 2021; Selfa et al., 2014; Traldi, 2021

Figure 1 shows an overview of literature coverage of different combinations of outcome categories, regions, and feedstocks. It is evident that some of these combinations are covered more than others. Overall, more observations were available for the economic impacts of certification compared to the social ones. Out of the 218 observations collected, 192 were categorised as economic and only 26 as social. For the economic categories, cost, revenue, and income were covered the most, especially for Asia and low-income countries. In contrast, only few quantitative observations on the impacts of certification on selling prices and market access were found. Regarding the social outcome categories, health, education, and well-being were covered more than the rest. Particularly few observations represented the impacts of certification on poverty reduction and labour condition.

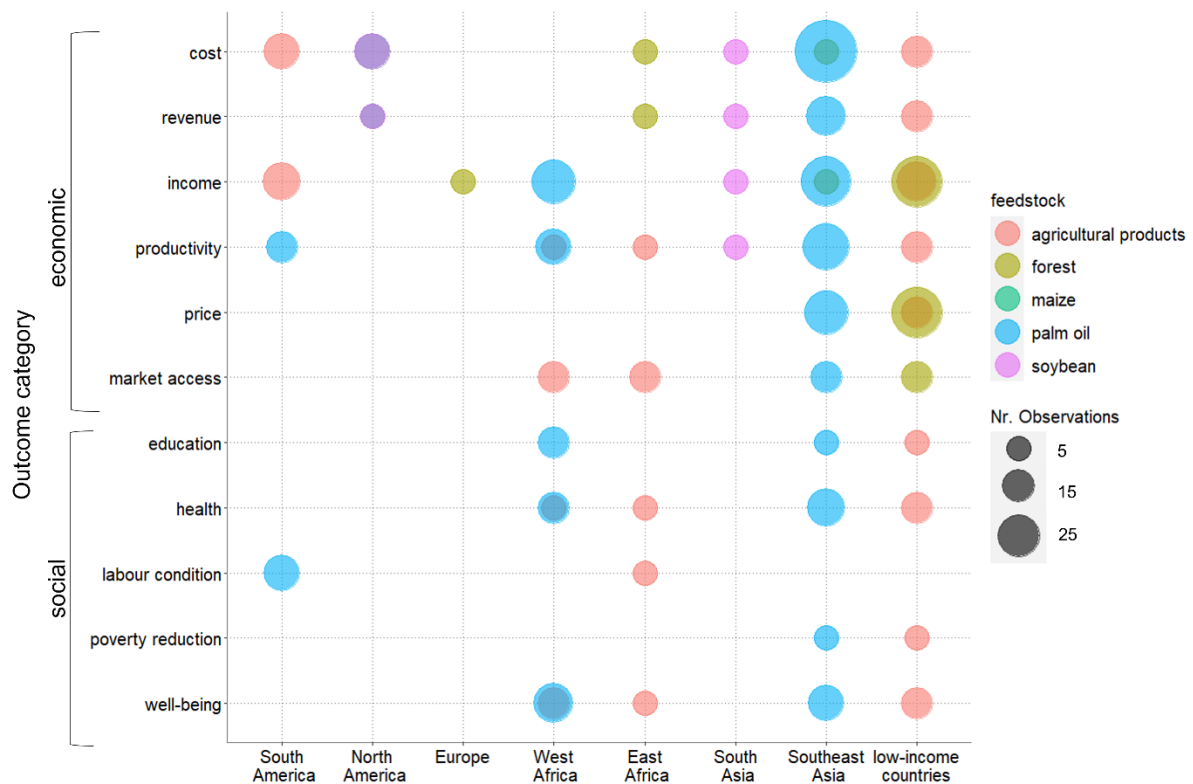


Figure 1. Overview of number of observations (total observations = 218) collected from literature covering different feedstocks, regions, and outcome categories. For this figure, direct and indirect costs are grouped into “costs” to increase readability. The category “low-income countries” on the x-axis represents studies that mentioned the location being in lower-income regions, without specifying the exact country. Similarly, the feedstock category “agricultural products” includes results from studies that did not separate the observations by specific feedstocks. No observations were found for sugarcane and raw cotton.

Moreover, lower-income regions such as West Africa, East Africa, and Southeast Asia were investigated more than the ones with higher incomes. Europe and North America had few data

points and the variety of feedstocks covered was limited. This might be because feedstock produced in Europe and North America already need to respect the governmental sustainability requirements for the region, so there is less need for CSLs.

Regarding the feedstocks, most observations collected were on palm oil (122), followed by forest and agricultural products (41 each). Very few (less than 10) observations were available for soybeans and maize, and no quantitative data were found on sugar cane and raw cotton. The high number of observations for palm oil reflects the high interest in palm oil that was generated in recent years around its sustainability concerns.

Most observations focused on the economic outcomes of certification in Asia, with a particular emphasis on Southeast Asia, predominantly associated with palm oil. However, it is worth noting that the number of available observations for each specific combination of feedstock, region and outcome category was quite limited, with less than 30 observations per combination.

Most studies showed that both costs and benefits increase for companies after certification (Figure 2). However, the increased benefits often compensate for the increase in costs.

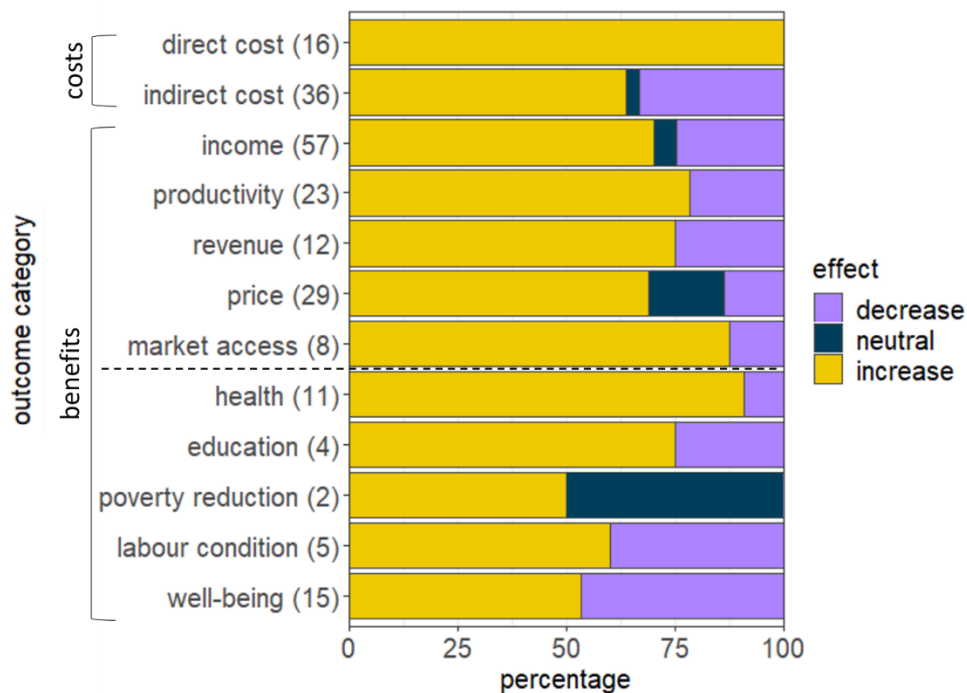


Figure 2. Percentage of observations indicating an increase, decrease, or neutral effect on outcome categories after certification. The dotted line indicates the separation between economic categories (top part) and social ones (bottom part). The numbers in brackets indicate the number of observations recorded for each outcome category.

The increase in benefits is particularly evident for the economic ones. For producers, this happens when better management and production practices lead to increased yields, which, associated with price premiums and improved market access, cause higher income, as indicated in Brako et al. (2021). Additionally, as pointed out by Bok et al. (2022), the costs, especially the indirect ones, tend to decline over time, increasing the economic benefits. The indirect costs consist of expenses needed to meet the sustainability criteria set by a CSL. For this, companies generally face higher upfront investments to get certified, followed by lower maintenance costs to uphold the certificate (Hutabarat et al., 2018). Also, the extent of indirect costs associated with certification depends on how closely the farm's management and

production system aligns with the CSL's requirements before undergoing certification. In cases where the pre-certification practices closely match the CSL's standards, the indirect costs are likely to be lower (Hidayat et al., 2016).

The findings on social benefits were more mixed than the economic ones (Figure 4). Social impacts are generally complex to determine precisely and are often measured in different ways in different studies. For instance, health was measured as exposure to toxic chemicals during production process in Blockeel et al. (2023), child mortality and nutrition in Brako et al. (2021), or number of new health facilities built in villages nearby certified areas in Morgans et al. (2018).

Similarly, education was measured by different indicators, e.g. years of schooling, child school attendance in Brako et al. (2021), and number of education facilities built in the certified area in Lee et al. (2019). All these indicators are important contributors to health and education but, if not consistently measured, make it hard to aggregate and compare the results from different studies. Still, our analysis identified an overall positive impact of certification on health and education. This is probably linked to the increase in farmers income, which might improve the access to healthcare and education for the farmers and their household members. The only negative impact that was found on health in the studies included in our review is in relation to nutrition (Brako et al., 2021); this might happen if certified areas replace areas where food for local use was previously grown.

Findings from literature also reveal that the negative impacts of certification tend to be experienced predominantly by smallholders compared to larger enterprises and companies located in low-income countries compared to high-income ones. Multiple factors might contribute to this, including reduced access to financial and legal resources. These also constitute a barrier to access certification. Some international certification schemes, such as the Forest Stewardship Council (FSC) and the Roundtable for Sustainable Palm Oil (RSPO), offer more tailored solutions for smallholders and are increasing their efforts to involve them in certification programs. However, the certification costs are still too high compared to the income of most smallholder producers. This is also in line with recent findings from Ayompe et al. (2024), stressing the importance of providing external financial support and assistance to smallholders. Although external support is important, it would also be beneficial that CSLs themselves increased their effort to include smallholders, for instance by actively including them in stakeholder consultations for the setting and revision of new standards. In the case of palm oil, smallholders control over 40% of the total production area in Malaysia and Indonesia (RSPO, 2024). Therefore, it is crucial to not only ensure they adopt sustainable practices but also to facilitate their inclusion in certification programs and the economic feasibility of certification for them.

5 Conclusions

This report provides an overview of the approach and key findings from collecting and analyzing data on direct and indirect costs and benefits of certification. It serves as a supplement to the dataset on direct and indirect costs and benefits of certification. In drawing conclusions, in the following we described the challenges of data collection and next steps.

An early discovery during data collection for direct costs (Task 6.1) was the varied pricing structures employed by different CSLs, posing challenges in comparing cost items across schemes. While it was premature to offer definitive recommendations, there was recognition of the potential to align certification categories to improve the comparability of costs and scheme characteristics on cost item definitions. Since definitive recommendations on the pricing itself are difficult to identify, the findings suggested a potential opportunity to standardize certification categories to enhance the comparability of costs and overall scheme characteristics.

These insights underscored the complexities inherent in analysing certification costs and highlighted the importance of standardising data collection approaches for meaningful comparisons and informed decision-making.

As for the indirect costs of certification, scientific literature focuses more on the economic impacts of certification compared to the social ones, particularly for feedstock producers. Certification typically has positive effects on certified farms or companies, even though it often leads to higher costs. There is a lack of research on how certification affects market access and price premiums, which are key drivers for certification. While certification generally increases profits, some entities, especially smallholders and businesses in low-income countries, experience no or negative impacts due to high costs and challenges in meeting certification requirements.

Smallholders face additional obstacles, such as obtaining legal documents and implementing better management practices. These obstacles lead to increased upfront costs and can discourage smallholders from participating in certification programmes. In low-income countries, complex ecosystems also raise management costs. The social impacts of certification, such as labor conditions and access to healthcare and education, are more mixed and less studied across the supply chain. Moreover, different studies measure social impacts in varying ways, making comparisons difficult.

To support smallholders, financial assistance from external organizations and governments is essential. Certification scheme owners should provide tailored solutions for smallholders' challenges. European policy defining the role of certification in the bioeconomy and its detailed requirements for certification needs to consider mitigating negative impacts on smallholders and adapt to different contexts to protect local communities. Future policies need to also give more attention to social sustainability, as current regulations focus mainly on environmental and economic aspects, neglecting social indicators.

Overall, additional research should be conducted on the direct and indirect costs and benefits of certification, and the data should be collected and analysed in a more harmonised way across different studies. Key aspects to harmonise are the variables used to measure the impacts of certification, as currently they are measured in different ways in different studies. For instance, the impact of certification on education was measured by different indicators, e.g. years of schooling, child school attendance, and number of education facilities built in the



certified area. Increased harmonisation would facilitate comparisons and allow to draw broader conclusions on the overall profitability of sustainability certification and the implications for entities in different contexts.

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8 Appendices

8.1 Database

The full database can be downloaded here:



HARMONITOR_(in)direct costs benefits cert

8.2 Glossary

The following section provides the definition and explanation of the costs and benefit found in the current report and linked dataset.

8.2.1 Definitions and explanations – direct costs

Table 6 provides an overview of the main concepts used in the analysis of direct costs and their definitions and explanations. Preparing this was important for defining common understanding across partners in order to make cost categories that can be compared across certification bodies and CSLs.

Table 6. Definition and explanations for direct costs categories.

Subject	Explanation
Direct costs	
Administration	Administration, Registration, Database Intro and associated costs
Auditing & reporting	Preparation for audit, undertaking of audit, and reporting of audit findings
Review	Technical review of audit report, incl. “four-eyes check”, and following preparation for issuance of certificate
Certification fees	CB: Annualised certification costs for the issuance of a certificate or Letter of Attestation CSL: Annualised – midsized companies
Travel expenses	Estimated average for travels within the country of origin for the auditor Estimated average for auditor travelling out of country of origin
Membership fees	Membership fees in Euro/year
Key concepts	
Agricultural Supplier EU (Individual Farm)	The majority of all individual farms in the EU participating in the above-mentioned Cross Compliance / Conditionality program commit themselves to follow the defined requirements – each Member State has to implement a controlling body/system that controls and monitors the performance of the participating farms; Therefore, some CSL already recognise the positive, documented participation in the GAECs/CAP in a way that approx. 2/3rds of the entire CSL Indicators are seen as compliant à hence, audits and inspections of farms do have a significantly reduced number of auditable Indicators compared to non-EU farms; this again leads to a shorter audit/inspection time and lower costs
Agricultural Supplier non-EU (Individual Farm)	Since there are no comparable respectively accepted programs outside the EU, all Criteria and Indicators are applicable to be audited à in this case, the

	audit and inspection time is significantly longer and therefore also more expensive
Collecting Point (CP / Group Certification)	A Collecting Point is an operational unit (same as FGP) that does not source agricultural material but collects Waste & Residues; the auditing process is similar to the FGP. However, the random sample of supplier audits depends on their size and risk category; since there is no CC for Waste & Residues, the audit process is the same within the EU and outside the EU; CP's are mainly coming under the EU RED Systems
Cross Compliance / CC (Conditionality is the new term now!)	<p>In order to receive EU income support, farmers must respect a set of basic rules. The interplay between this respect for rules and the support provided to farmers is called conditionality.</p> <p>Rules farmers are expected to comply with include:</p> <ul style="list-style-type: none"> - Statutory Management Requirements (SMRs). These apply to all farmers whether or not they receive support under the EU's Common Agricultural Policy (CAP) - Good Agricultural and Environmental Conditions (GAECs). These applies only to farmers receiving support under the CAP. <p>Farmers violating EU law relating to environmental, public and animal health, animal welfare or land management will have their EU support reduced and may face other penalties. Details: https://agriculture.ec.europa.eu/common-agricultural-policy/income-support/conditionality_en</p>
First Gathering Point (FMG / Group Certification)	A First Gathering Point is an operational unit that purchases agricultural feedstocks from several contracted agricultural suppliers; these suppliers declare via Self-declaration that they comply with the requirements of the specific CSL and/or conduct an annual internal audit which documents the compliance level; besides the audit of the FGP itself (management system, coordination of suppliers, Traceability, etc.), a certain number of suppliers is selected and externally audited to see whether they comply with the CSL requirements; the CSL defines the size of the random sample of these supplier audits; other names for FGP are also, e.g. Farm Management Group, Farmer Group, etc.

8.2.2 Definitions and explanations – Indirect costs

Table 7 provides an overview of the key concepts and definitions for studying the indirect costs of certification.

Table 7. Definition of outcome categories related to costs and benefits of certification.

Outcome category	Description
Direct cost	Costs directly requested by the CSL, such as certificate fee, auditing costs, etc.
Indirect cost	Costs of meeting the sustainability requirements set by the CSL (investments to upgrade management system, production techniques, new machinery, etc.)
Productivity	Usually measured as crop output over a period of time
Revenue	Total amount of income generated by the sale of products
Income	Revenue - Costs
Market access	The ability of a company to enter the market and sell their goods
Price premium	Difference in price between a certified product and the uncertified equivalent
Health	The impact of certification on the health of people working in companies (i.e., illness rate, access to healthcare, safety in the workplace)



Education	Assessment of whether certification improves access to education of people working in the companies and their households (i.e., years of schooling of children in farmers households, school drop-out rates, access to trainings, etc.)
Poverty reduction	Measures whether certification has a positive impact on poverty of people living in certified areas (i.e., number of people living under poverty line)
Labour condition	Covers workers' conditions such as salary, employment conditions, etc.
Well-being	Broad category covering a variety of variables that impact the well-being of people and/or could not be included in the other outcome categories (i.e., social relations, satisfaction, access to basic needs, social mechanism, etc.)