Star4bbs

D 3.4

Sustainability requirements for the monitoring system

Funded by the European Union

www.star4bbs.eu
info@star4bbs.eu

@STAR4BBS

D 3.4

Sustainability requirements for the monitoring system

DELIVERABLE TYPE

Report

MONTH AND DATE OF DELIVERABLE

M34, 06/30/2025

WORK PACKAGE

WP 3

LEADER

USC

DISSEMINATION LEVEL

Public

AUTHORS

USC

Programme	Grant Agreement	Start	Duration
HORIZON EUROPE	101060588	Sept.2022	36 Months

Funded by the European Union

Contributors

NAME	ORGANISATION
Dr. Ana Arias	USC
PhD Jose Luis Ares	USC
Prof María Teresa Moreira	USC

Peer Reviews

NAME	ORGANISATION
Luana Ladu	TUB
Nikola Matovic	TUB
Maira Devisscher	ISEAL

Revision History

VERSION	DATE	REVIEWER	MODIFICATIONS
V1	14/04/2025	Ana Arias, Jose Luis Ares, María Teresa Moreira	First draft
V2	26/06/2025	Ana Arias, Jose Luis Ares, María Teresa Moreira	Final version

Index of Contents

Index of Tables

Index of Figures

Partners short names

TUB	Technische Universitat Berlin
UNITELMA	Università degli studi Unitelma di Roma
UNI	Ente Italiano di Normazione
AUA	Agricultural University of Athens
USC	Universidad de Santiago de Compostela
APRE	Agenzia per la Promozione della Ricerca Europea
NOVA	Institut for politische und Okologische Innovation GMBH
BB	Better Biomass
BAM	Bundesanstalt fuer Materialforschung und Pruefung
RSB	Roundtable on Sustainable Biomaterials Association
ISEAL	ISEAL Alliance

Abbreviations

BMT	BIOBASEDCERT Monitoring Tool
CSLs	Certification schemes and labels
SHS	Smallholders' standards
MR	Minimum requirement

Executive Summary

Voluntary sustainability certification schemes and labels (CSLs) can be important tools in the transition towards a circular bioeconomy. However, economic actors are often overwhelmed by the high number of CSLs and the different approaches they use, and it is well known that CSLs vary significantly in terms of their robustness and effectiveness. To facilitate the identification of CSLs with the highest potential contribution in the bio-based sector, the STAR4BSS project joined forces with its sister projects (SUSCERT4BIOBASED and HARMONITOR) and created the BIOBASEDCERT monitoring tool (BMT). The BMT enables a comprehensive assessment of CSLs, from the way they operate (system level), the sustainability performance they require for certification (content level), and how they monitor change overtime (outcome level). The BMT was specifically designed around EU sustainability goals and priorities.

Through the development of the BMT, it became clear that CSLs often have special provisions for certifying small-scale producers (smallholders). Certification can be used to drive the adoption of more sustainable production practices by smallholders if the requirements are carefully adjusted to fit that specific context. This report presents analysis carried out by the STAR4BSS project to whether the minimum requirements included in the content level of the BMT can also apply to smallholders. The analysis demonstrates that the capacity of smallholders to attain certain requirements is lower compared to large companies, thus only a small number of requirements should be considered as applicable to smallholders. It is also concluded that more attainable criteria and adequate support should be provided in order to help them on the certification processes. Besides, the findings of this report help clarify the scope and application of the BMT, highlighting that future efforts should focus on developing monitoring tools and certification schemes that reduce barriers for smallholders, such as simplified certification processes, training programs for sustainability and circularity, financial incentives and technological support.

1 Introduction

When promoting and moving towards more sustainable and circular value chains, it is essential that all elements of productive value chains act appropriately (Velenturf & Purnell, 2021). While the largest producers have the greatest influence, both in terms of their environmental impact and their role in advancing a circular and sustainable global economy (García-Sánchez et al., 2021)—smallholders (small-scale producers), who are essential for the proper and balanced performance of value chains—can have a tangible impact and make a significant contribution to food security, biodiversity conservation, social communities and rural sustainability (Khan et al., 2024; IFAD, U., 2013; Beall, E., 2011). In fact, smallholders are a key factor in sustaining local economies in agricultural, livestock and forestry value chains, as well as an important part of the global food sector (Schoneveld & Weng, 2023; Ros-Tonen et al., 2019). As an example, according to Riccardi et al. (2018), the farms under 2ha represents an 84% of all farms within the World Census of Agriculture, which encompasses 167 countries.

Smallholders' traditional sustainable practices contribute to the conservation and maintenance of ecosystem services, making them valuable stewards of natural resources (Sagie & Orenstein, 2022; Rode et al., 2016). However, their economic capacity to adopt more efficient and effective techniques and technologies, is not as high as that of large producers, making the adoption of sustainable and circular practices a challenge for them (Ho et al., 2023). In addition, a general lack of access to training or knowledge-sharing platforms also reduces their capacity to adapt to new production strategies in agriculture, livestock and forestry (Murano et al., 2023; Takacs et al., 2022). The lack of policy incentives and institutional support also hampers their ability and capacity to promote the transition to a more sustainable and circular production models (NDC, 2024; Cantelmo et al., 2023).

Smallholders are typically referred to as farmers who operate on a small scale with limited land and resources. They constitute the backbone of agriculture in many countries. However, this term can also encompass pastoralists, fishers, and forest keepers who contribute to diverse rural livelihoods at a small scale (FAO, 2013). Indeed, a study published by the Food and Agriculture Organisation (FAO) in 2021 revealed that smallholder farmers account for approximately 35% of the world's food production. This represents five out of six farms globally that are less than two hectares in size, accounting for around 12% of all agricultural land. Notably, the influence of smallholder farmers can be even more pronounced in certain sectors, such as coffee and cocoa, where they are responsible for 60% and 80-95% of the global production, respectively (IEEP, 2022). Given this significant contribution, small-scale producers play a crucial role in sustainable resource management, global food security, and rural employment.

Consequently, standardisation frameworks and policies also place a strong emphasis on the sustainability and circularity management activities associated with small-scale producers. For instance, the United Nations Sustainable Development Goals (SDGs) include a dedicated target (SDG 2.3) to *"double the agricultural productivity and incomes of small-scale food producers" by 2030*, increasing their market and

opportunities (FAO, 2025). To achieve this objective, voluntary sustainability standards can play a pivotal role.

On the other hand, numerous studies have highlighted the barriers that smallholders face in obtaining certification, as well as the potential benefits it can bring. Individual certification remains relatively uncommon among small-scale producers, mainly due to limited financial resources and the technical capacity required to navigate the often costly and bureaucratic certification processes. To address these challenges, external assistance is often necessary—frequently in the form of support for establishing certified cooperatives. Generally, research suggests that certified smallholders tend to receive higher prices and incomes than their non-certified counterparts. Nevertheless, the magnitude of these benefits varies widely, and questions remain about how much of this additional income is reinvested in productive areas—such as training and employment—and how much is absorbed by the costs associated with certification itself (Marx et al., 2022; Meemken, 2020; Bitzer & Steijn, 2019).

To support smallholder livelihoods and meet their specific needs, many certification schemes provide special considerations for smallholders in their standards. Moreover, several certification schemes operate standards especially designed for smallholders and support group certification as a way to drive adoption of sustainable practices by smallholders.

Against this backdrop, it is valuable to consider how monitoring tools (benchmarks) that assess the effectiveness and robustness of certification schemes and labels (CSLs) approach this aspect of smallholder support. This report (Deliverable 3.4) informs the scoring mechanism of the BIOBASEDCERT monitoring tool (see Box 1) by identifying minimum requirements that are applicable to smallholders. The requirements relate to the level of sustainability performance required, including circularity.

This work builds on several other deliverables produced under the STAR4BSS project, namely:

- Deliverable *D3.3 Report on metrics, thresholds and minimum requirements for sustainability indicators*
- *D3.1 Report on sustainability indicators for the monitoring system based on Life Cycle assessment*
- *D3.2 Report on additional indicators of monitoring system*

Box 1. BIOBASEDCERT Monitoring Tool (BMT)

The **STAR4BBS** project (Sustainability Transition Assessment Rules for Bio-Based Systems) is a Coordination and Support action, developed in the framework of the Horizon Europe call HORIZON-CL6-2021-ZEROPOLLUTION-01-07: *International and EU sustainability certification schemes for bio-based systems*. Two other projects – **HARMONITOR** (Harmonization and monitoring platform for certification schemes and labels to advance the sustainability of bio-based systems) led by SQ Consult, and **SUSTCERT4BIOBASED** (Sustainability Certification for Biobased Systems) led by Stichting Wageningen Research, were also funded in the same call. The three sister projects collaborate on a range of activities. One of them is the development of a BIOBASEDCERT Monitoring Tool, of which the initial proposal, accepted by the EU officials in June 2023, is included in the Annex of *D4.1. Concept of the monitoring system*.

The goal of the three sister projects working together was to develop a BIOBASEDCERT Monitoring Tool (BMT) to reduce confusion, divergences, and mistrust among stakeholders by creating a harmonized, overarching system. This will bring coherence to space and clarity for policymakers, driving the transition to a bioeconomy in the EU. Working together allowed the projects to build on each other's knowledge and experience, subject the BMT to greater scrutiny, and maximize the effective use of resources. The BMT streamlined stakeholder consultations and reduce fatigue while eliminating competition among the three projects and maximizing the synergies and impacts of the results.

The monitoring tool incorporates a comprehensive set of indicators aimed at gathering crucial information on the effectiveness and robustness of CSLs. These indicators are structured into three levels:

I) System Level: These indicators focus on the characteristics of the certification scheme, including its governance and the development process of standards or labels.

II) Content Level: These indicators specify the requirements of the certification scheme concerning various EU environmental, social, economic, and circularity priorities and targets. Minimum requirements that all CSLs should adhere to were defined from a life cycle perspective.

III) Outcome Level: The outcome indicators measure the impact generated by the certification schemes and labels. They encompass life-cycle assessment comparison indicators and continual improvement indicators.

This report comprises two principal sections. **Section 2** addresses the analysis of the compliance of the minimum requirements identified for the sustainability pillars and circularity for smallholders as follows: ***Subsection 2.1*** introduces the methodological roadmap considered for the final selection of the minimum requirements applicable for smallholders. ***Subsection 2.2*** focuses on the identification of the certification schemes that considers the integration of smallholders' requirements. ***Subsection 2.3*** analyses the minimum requirements for each sustainability pillar and circularity and select the ones that could be considered as applicable for smallholders. **Section 3** discusses the main challenges (***Subsection 3.1***) and the potential solutions (***Subsection 3.2***) for smallholders to move forward more sustainable and circular practices. Finally, **Section 4** presents the main conclusions drawn in Deliverable D3.4.

2 Refinement of the content level

2.1 Selection of smallholders' minimum requirements.

Figure 1. Methodological roadmap for analyzing the MR applicable to smallholders.

Stage 1 involved an in-depth analysis of the 19 certification schemes previously outlined in the *D3.3 Report on metrics, thresholds, and minimum requirements for sustainability indicators*. The limitation of the study to these schemes stems to be consistent with our previous findings, in which we demonstrated their robustness and credibility within the context of voluntary sustainability standards. The objective of this analysis was to identify which certification schemes explicitly consider smallholders in their criteria and requirements. This determination was made to assess whether each requirement was deemed non-applicable, adjusted/reduced, or fully applicable to smallholders.

In fact, many requirements were already identified for the Content Level of D3.2 and the most relevant ones were selected as *minimum* from the perspective of CSLs owners and policy frameworks in D3.3. Since smallholders often lack the resources and technical knowledge to implement a wide range of sustainability and circularity measures, focusing on the most critical ones appears to be a practical starting point to guide future standards and policies tailored to smallholders. In this way, the **Stage 2** involved identifying which of these previously selected minimum requirements were considered

applicable or not to smallholders according to the guidelines of the certification schemes including specific standards or criteria for smallholders.

However, it is important to note that discrepancies do exist among certification schemes, meaning that what is considered as an applicable requirement for smallholders in one standard may not be included in other one. To overcome this lack of alignment on the limited available information the **Stage 3** proposing a scoring system was developed. This consisted of determining the applicability of the minimum requirements from D3.3 to smallholders, providing scores to the requirements included on smallholders' standards according to the three different approaches explained below.

First (Method A), a score was given taking account the quality of the certification schemes in terms of (1) applicability, (2) sectors of the bioeconomy covered and (3) stages of the value chain to which it refers. A second score (Method B) was given according to the relevance and robustness of the analysed standards within the smallholder's certification context, i.e. the certification scheme that makes greater reference to smallholders is the one that will be more relevant. In this way, a total of three score values has been taken into consideration: (3 points) for the two certification schemes that demonstrate a higher inclusion of requirements for smallholders, (2 points) for the subsequent two schemes demonstrating a lower inclusion, and (1 point) for the scheme that takes into account the integration of smallholders to a lesser extent. This level of inclusion was calculated for each smallholder standard as the percentage resulting from the number of included requirements divided by the total number of requirements assessed for each sustainability pillar. The third (Method C) consisted in a qualitative evaluation of the characteristics of each requirement, including its applicability, relevance, and feasibility for smallholders.

It is crucial to acknowledge that the quantity of minimum requirements identified per pillar in our previous deliverable is not uniform. For instance, the environmental sustainability pillar encompasses a total of 21 minimum requirements, the social pillar 7, the economic pillar 2, and the circularity pillar 13. In addition, it is notable that, in terms of circularity, most certification schemes do not incorporate requirements in this regard, as it is a recent concept. The focus is more on criteria related to product design and circularity of production processes. In contrast, environmental and social aspects are more extensively addressed, though still with certain limitations.

The final **Stage 4** consisted in take a final decision on the applicability of each requirement to smallholders according to the results of the different scoring approaches. To be considered as applicable considering the methods (A) and (B) a minimum scoring must be achieved to guarantee the robustness and reliability of this result. This will be further explained in next sections according to the results of the analyses. The final decision was made considering also approach (C), analysing if the requirement can be feasible for smallholders based on their resources and technical knowledge and if it is relevant to them according if the measure has a reasonable impact avoiding impacts on the different pillars at this small production level.

2.2 Identification of smallholders' standards.

In *D3.3*, a total of 19 certification schemes were evaluated and listed in **Table 1** for the identification of minimum requirements to be considered in the proposed monitoring system for the STAR4BBS project. However, not all of them include references to smallholders, as their focus is primarily on large-scale producers. Therefore, the initial step in identifying the minimum requirements applicable to smallholders was to determine which certification schemes explicitly include provisions or statements addressing smallholders. Out of these 19, only 5 consider smallholders in the analysis, namely *RSB*, *Better Biomass*, *Rainforest Alliance*, *Fair for Life* and *Fairtrade International*. Indeed, there are CSLs that have separate standards for smallholders, that were also analyzed in this report, as it is the case of RSB Standard for Certification of Smallholder Groups or RSPO Independent Smallholder Standard. Therefore, these certification schemes will be re-examined to determine which minimum requirements are applicable to smallholders and which are not. This constitutes the first step in formulating the final set of requirements for the monitoring system, while accounting for the distinction between large- and small-scale producers within the value chain.

Table 1. Identification of the certification schemes (CSLs) that have specific standard for smallholders

CSLs	Does the CSL include smallholders' requirements?
RSB Global Advanced Products Certification	Yes
ISCC Plus	No
OK Biobased	No
Bio-Based Content	No
REDcert	No
Green Gold Label	No
Better Biomass	Yes
OK Compost	No
OK Biodegradable	No
Cradle to Cradle	No
Rainforest Alliance	Yes
Forest Stewarship Council (FSC)	No
Programme for the Endorsement of Forest Certification (PEFC)	No
ASC-MSC Seaweed Standard	No
GoodWeave	No
Green Button	No
COSMOS	No
Fair for Life	Yes
Fairtrade International	Yes

Table 2 presents the key characteristics of these certification schemes in relation to the bioeconomy sectors they cover. Among them, *RSB* stands out as the most comprehensive, followed by *Better Biomass* and *Fairtrade International*. Regarding the stages of the value chain considered by each scheme, *RSB* and *Fairtrade International* are again the most complete in this aspect. Additionally, the table highlights the distinguishing features of each scheme in terms of coverage and main monitoring aspects. To support the analysis, each certification scheme is assigned a score based on

its overall coverage, as explained in the previous section. The scoring system assigns the highest value (5 points) to the most comprehensive scheme—*RSB* in this case—while a score of 1 point is given to more specialized schemes that address fewer sectors, requirements or value chain stages.

Table 2. Identification of the certification schemes (CSLs) that analyze smallholders. Green cells indicate that the value chain stage is covered; orange cells indicate it is not considered.

CSLs	Bioeconomy sectors included	Value chain stages				Main description	Order and score	
		1	2	3	4			
RSB Global Advanced Products Certification	Agriculture, silviculture, energy, forestry /chemical / textile / paper industries, liquid biofuels					Comprehensive and complete approach to sustainability, covering social and environmental aspects in depth. It has a very wide geographical coverage, and it considers and is applicable to all sectors of the bioeconomy.	1st	5
Better Biomass	Agriculture, silviculture, forestry /chemical / textile industries					Robust certification like RSB, but applicable to less bioeconomy sectors in comparison.	2nd	4
Rainforest Alliance	Forestry / chemical / textile industries					It is robust in terms of environmental and social criteria, but its applicability is limited as it covers a smaller number of bioeconomy sectors.	3rd	3
Fair for Life	Agriculture, paper industries					The standard mainly focuses on biodiversity and conservation issues, and it has limited applicability to small producers.	4th	2
Fairtrade International	Agriculture, silviculture, energy, liquid biofuels					It provides limited information on environmental and social aspects and its geographical coverage is limited to Europe.	5th	1

2.3 Validation of the minimum requirement applicability on smallholders' standards

To effectively integrate the principles of sustainability and circularity into the activities of smallholders, it is essential to ensure that the minimum requirements are achievable for them. Given their limited economic and production capacity, meeting standardized criteria can be challenging. This section explores the feasibility and relevance of the minimum requirements identified for the three pillars of sustainability—environmental, social, and economic—as well as for circularity, in the context of smallholders. The goal of this analysis is to refine the proposed STAR4BBS monitoring system, ensuring it provides better support for smallholders in adopting sustainable and circular practices, while also maintaining productivity and resilience.

2.3.1 Environmental pillar

In the case of the environmental pillar, 21 minimum requirements were found to be mandatory in the STAR4BBS content level assessment matrix. The feasibility of applying these minimum requirements to smallholders was assessed, and the results of this analysis are presented in **Table 3** The table uses colour coding to indicate the applicability of the requirements: green for those deemed applicable to smallholders by the certification schemes, red for those that are not applicable (due to their difficulty or the lack of sufficient mechanisms to achieve them, among other reasons), and grey for those requirements that make no reference to smallholders and are therefore not considered applicable to them. The analysis shows that the certification schemes evaluated largely take smallholders into account, although some of the established minimum requirements are not framed in a way that is suitable for smallholders according to any of the schemes, as in the case of EN-W-2, EN-B-6, EN-NR-1, EN-NR-4, EN-NR-7 and EN-HS-1.

An analysis of these requirements reveals that four of them are related to monitoring and impact assessment, which is considered a complex practice for smallholders due to their limited technological capacity and lack of training and education. The remaining three requirements, related to natural resources (EN-NR), focus on the use of sustainable inputs and the implementation of sustainable practices in productive activities. These requirements may also lead to higher operational costs, potentially affecting the economic viability and value generation capacity of smallholders. Based on this analysis, it is deemed appropriate for certification schemes not to apply these minimum requirements to smallholders. Consequently, these requirements are not considered applicable for smallholders in the STAR4BBS monitoring system.

*Table 3. Environmental pillar - Minimum requirements applicable to smallholders. Colour code: **Red colour** indicates that the CSL establish that this requirement is NOT applicable to smallholders according to the CS and **Green colour** indicates that the CSL establish that this requirement is applicable to smallholders according to the CS. MR: minimum requirement.*

MR	Fair for life	Fairtrade	Rainforest Alliance	RSB	Better Biomass
EN-CC1					
EN-CC-2					
EN-CC-3					
EN-W-1					
EN-W-2					
EN-W-4					
EN-W-8					
EN-S-1					
EN-B-3					
EN-B-5					
EN-B-6					
EN-B-7					
EN-B-8					
EN-B-9					
EN-NR-1					
EM-NR-4					
EN-NR-7					
EN-HS-1					
EN-HS-3					
EN-HS-6					
EN-G-1					

The analysis of the other minimum requirements is presented in **Table 4** including the final decision on inclusion or non-inclusion in the monitoring system.

For the final selection of smallholder minimum requirements, three levels of analysis were considered (as defined in the assessment methodology section and explained on **Figure 2**): (A) scoring according to Table 2 for each of the certification schemes, (B) scoring based on the level of compliance of the certification schemes with respect to smallholders and (C) evaluating the appropriateness of the minimum requirements

identified as "Yes" according to scoring of (A) and (B), to determine their feasibility for smallholders

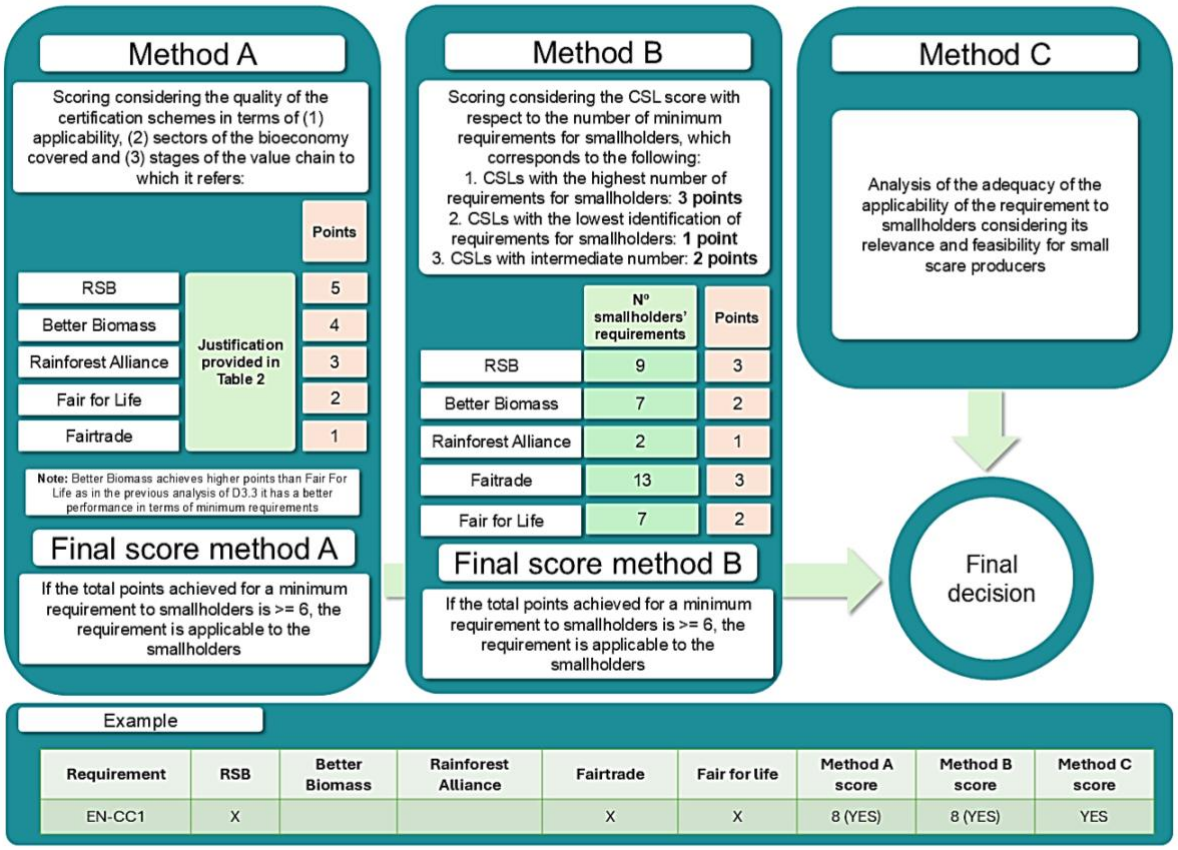

Figure 2. Scoring system

Taking this assessment method into account, it can be observed that there are no discrepancies between methods (A) and (B), except in the case of minimum requirement EN-CC-2. According to method (A), this requirement should not be considered applicable to smallholders, while method (B) suggests that it should. Therefore, to make a final decision regarding the inclusion of EN-CC-2 for smallholders, evaluation method (C) is used. This requirement involves the quantification of GHG emissions using a specific methodology. Given the lack of training and the need for monitoring technologies to meet this requirement, it is concluded that it should not be mandatory for smallholders.

Additionally, there are two other minimum requirements that, although considered applicable by the certification schemes according to methods (A) and (B), are deemed unsuitable for smallholders following method (C). These are EN-B-5 and EN-B-8, which advocate the creation of a biodiversity plan with monitoring and restoration practices to balance resource use. Given the challenges, need for training, and access to appropriate monitoring technologies, it is determined that these requirements should not be mandatory for smallholders, at least in the short term, and are therefore excluded from the smallholder monitoring model.

Therefore, after completing the compliance analysis for the 21 minimum requirements of the environmental pillar, it is concluded that seven of them should also be applied to

smallholders. It is important to note that, in this selection, all the key areas of the environmental pillar identified for the minimum requirements are considered mandatory for smallholders, except for the key area of natural resources (NR), which focuses primarily on monitoring and using sustainable resources, and the generic (G) area, which requires operators to receive training in sustainable practices. This last requirement could be challenging for smallholders.

Table 4. Environmental pillar – analysis and final decision for minimum requirements applicable to smallholders. Acronyms: MR (minimum requirement), SHs (smallholders).

MR	Scoring according to Table 2	MR for SHs?	Scoring according to level of compliance	MR for SHs?	Adequate MR for SHs?	Final decision – MR applicable to SHs?
EN-CC-1	8	YES	8	YES	Yes, feasible to be applicable for SHs	YES
EN-CC-2	9	NO	9	YES	**No:** Quantifying lifecycle GHG emissions with a specific methodology is challenging without training for smallholders	NO
EN-CC-3	2	NO	2	NO	Not applicable according to CSLs	NO
EN-W-1	12	YES	12	YES	Yes, feasible to be applicable for SHs	YES
EN-W-2	0	NO	0	NO	Not applicable according to CSLs	NO
EN-W-4	4	NO	4	NO	Not applicable according to CSLs	NO
EN-W-8	12	YES	12	YES	Yes, feasible to be applicable for SHs	YES
EN-S-1	12	YES	12	YES	Yes, feasible to be applicable for SHs	YES
EN-B-3	7	YES	7	YES	Yes, feasible to be applicable for SHs	YES
EN-B-5	8	YES	8	YES	**No:** Creating a biodiversity plan involves technical expertise, regular monitoring, and often external assistance, making it difficult for smallholders to implement.	NO
EN-B-6	0	NO	0	NO	Not applicable according to CSLs	NO
EN-B-7	7	YES	7	YES	Yes, feasible to be applicable for SHs	YES
EN-B-8	11	YES	11	YES	**No:** Restoration practices are resource-intensive and challenging for smallholders without significant external support.	NO
EN-B-9	2	NO	2	NO	Not applicable according to CSLs	NO
EN-NR-1	0	NO	0	NO	Not applicable according to CSLs	NO
EN-NR-4	0	NO	0	NO	Not applicable according to CSLs	NO
EN-NR-7	0	NO	0	NO	Not applicable according to CSLs	NO
EN-HS-1	0	NO	0	NO	Not applicable according to CSLs	NO
EN-HS-3	7	YES	7	YES	Yes, feasible to be applicable for SHs	YES
EN-HS-6	2	NO	2	NO	Not applicable according to CSLs	NO
EN-G-1	2	NO	2	NO	Not applicable according to CSLs	NO

Based on the analysis of the minimum requirements that apply to smallholders, several conclusions can be drawn. The minimum requirements that do not apply to smallholders mostly share common factors, such as the difficulty of monitoring, lack of training, and economic capacity/viability:

Monitoring activities – In general, CSLs agree that the quantification of the environmental impacts and the monitoring of the productive activities should not be required of smallholders due to the lack of advanced technologies and training.

Daily practices – Although to a lesser extent, the implementation of environmental protection practices should also be considered for smallholders, aiming to reduce impacts as much as possible from the early stages of the value chain.

Sustainable resources – CSLs do not compel smallholders to practice sustainable resource consumption or to use sustainable sources of supply, given the economic and infrastructural challenges this could entail.

Workers – All CSLs for smallholders include criteria to protect workers' rights.

Local community – Smallholders are not required to implement specific practices related to local community relations or responsibility along the value chain.

Food security – While smallholders should be aware of the importance of ensuring food security and developing sustainable use of available resources within their activities, they are not required to ensure or improve local food security in the related value chains.

Since the environmental pillar is the most analysed in the CSLs and also the one with the most references to smallholders, these conclusions will be extrapolated to the other pillars of sustainability and circularity, particularly concerning the economic and circularity aspects, as these are not yet well reflected in the CSLs. This will provide a general overview of which minimum requirements should be considered for smallholders and which, due to their complexity of application, should be reserved for large producers in the value chain.

2.3.2 Social pillar

The social pillar is also well analyzed by the certification schemes, reaching a total of 7 minimum requirements to be fulfilled according to the analysis made in D3.3. As far as smallholders are concerned, there is a high acceptance of the implementation of the selected minimum requirements by the certification schemes, with the only exception of the *Better Biomass* scheme, which does not refer to smallholders for any of the minimum requirements analyzed (**Table 5**). On the other hand, only one of the minimum requirements is not addressed by any of the certification schemes under analysis, namely LC-5, which pertains to the measurement and accounting for the promotion of local employment, including indigenous communities. This requirement is considered inapplicable to smallholders, as they lack the resources to significantly promote local employment and are more affected by market pressures (price volatility, demand for products, competitive markets, etc.), which leads them to focus primarily on productivity

rather than increasing employment. Additionally, it is important to note that many smallholders are typically family-owned or employ seasonal workers informally, which makes structured employment initiatives challenging.

Furthermore, the minimum requirement SO-3 is not extensively covered by the evaluated CSLs, with only RSB considering it applicable to smallholders. This requirement refers to the need for smallholders to take appropriate measures to ensure local food security and conduct impact assessments to identify potential risks. As noted in the final analysis of the environmental profile, while smallholders must consider the appropriate use of raw materials in the value chain to avoid compromising food safety, they cannot realistically be required to strengthen, analyse and monitor the food value chain as a minimum requirement, mainly due to the lack of adequate technology and limited training in this area.

Table 5. Social pillar - Minimum requirements applicable to smallholders. Colour code: Red colour indicates that the CSL establish that this requirement is NOT applicable to smallholders according to the CS and Green colour indicates that the CSL establish that this requirement is NOT applicable to smallholders according to the CS. MR: minimum requirement.

MR	Fair for life	Fairtrade	Rainforest	RSB	Better Biomass
LC-5					
SO-3					
WO-1					
WO-4					
WO-6					
WO-9					
WO-11					

Therefore, both LC-5 and SO-3 would not be considered as minimum requirements for smallholders. Another aspect that stands out in Table 5 is the minimum requirement WO-6, which is classified as "not applicable to smallholders" by the *Rainforest Alliance* certification scheme but is applicable to smallholders by the other CSLs (except for Better Biomass). Considering the discrepancy between the certification systems, an analysis of the minimum requirements was conducted to make the final decision. WO-6 refers to the implementation of measures to protect rights related to forced labour, addressing both physical and psychological violence against workers. Given the importance of maintaining a proper working environment for all workers, where compliance with labour laws must take precedence over all other requirements, it is considered that the minimum requirement WO-6 is fully applicable to smallholders.

Regarding the remaining requirements, these are considered applicable by at least three of the certification schemes under evaluation. The minimum requirement WO-9 is the most frequently cited, and it is found to be applicable to smallholders by 4 out of the 5 certification schemes. This requirement pertains to the establishment of adequate protection measures for workers to ensure their safety, which must always be an essential element, regardless of the production level or capacity of the company. While not required by all certification schemes, the other minimum requirements are considered mandatory for smallholders. These include the respect for the minimum age of workers according to applicable law (WO-1), the promotion of equal opportunities (WO-4), and the establishment of a reasonable working day, all of which are regarded as

basic rights that every worker should have. In summary, the final decision on the applicability of the social-related minimum requirements is presented in **Table 6**.

Table 6. Social pillar - analysis and final decision for minimum requirements applicable to smallholders. Acronyms: MR (minimum requirement), SHs (smallholders

MR	Adequate MR for SHs?	Final decision – MR applicable to SHs?
LC-5	**No:** measurement and accounting for the promotion of local employment could be challenging to smallholders, as those don't have the resource capacity to largely promote local employment and are more subject to market pressures	**NO**
SO-3	**No:** analyzing and measuring local food security and carrying out impact assessments to identify potential risks could not be asked for smallholders, as those are not having the sufficient financial support and training.	**NO**
WO-1	Yes, feasible to be applicable for SHs	**YES**
WO-4	Yes, feasible to be applicable for SHs	**YES**
WO-6	Yes, feasible to be applicable for SHs	**YES**
WO-9	Yes, feasible to be applicable for SHs	**YES**
WO-11	Yes, feasible to be applicable for SHs	**YES**

2.3.3 Economic pillar

As outlined in D3.3, the economic pillar is not extensively incorporated into certification schemes, in contrast to the environmental and social pillars. According to D3.3, two economic requirements were identified as minimum requirements: one for the key area of economic risks (ER-1) and one for the one of long-term investment (LTI-4) (**Table 7**). Of these, LTI-4 is considered not applicable for smallholders because it refers to the use of an economic amount for innovation activities and sustainability strategies, given the economic and infrastructures challenges that could imply this could negatively affect economic viability. On the other hand, ER-1 refers to the need to document and quantify all economic aspects associated with the process or activity conducted to identify the economic viability of the same in the long term. This minimum requirement is considered applicable to smallholders, as every productive activity must be economically viable in the long term to ensure its stability in the value chain.

Table 7. Economic pillar - analysis and final decision for minimum requirements applicable to smallholders. Acronyms: MR (minimum requirement), SHs (smallholders

MR	Adequate MR for SHs?	Final decision – MR applicable to SHs?
ER-1	Yes, feasible to be applicable for SHs	**YES**
LTI-4	**No:** The lack of financial support for smallholders makes it challenging to allocate a percentage of the available budget for sustainable and innovative activities and strategies	**NO**

2.3.4 Circularity pillar

The concept of a circularity pillar is a recent development, and its application in certification schemes beyond its general principles is not yet well-established. For this reason, in D3.3, the minimum requirements were selected based on internationally recognized policies and documents, such as the new ISO on circularity (ISO 59004). The outcome of D3.3 indicated that a total of 13 requirements should be recognized as applicable minimum requirements.

For smallholders, two of these minimum requirements are considered not directly applicable by the *Rainforest* certification scheme. One of them is EOLS-3, which relates to the key area of the "end of life stage," defined as the commitment to separate and recycle all waste generated. This can be a challenge for smallholders, particularly if they lack the necessary infrastructure or training to identify the most appropriate life cycle management strategy in terms of sustainability and economic circularity. Although the *Fair for Life* certification scheme considers this requirement applicable to smallholders, for the reasons mentioned above, it is concluded that EOLS-3 is not applicable to smallholders.

Rainforest has also stated that requirement PP-12, which refers to establishing, implementing, and maintaining an appropriate system to improve energy efficiency, is not applicable. However, Fairtrade considers this requirement applicable. Given that the economic activities of smallholders typically do not involve comparatively high energy consumption, the impact is less significant. Nonetheless, integrating more energy-efficient technologies may present challenges in terms of infrastructure, economics, and technical training. As a result, PP-12 is not applicable to smallholders.

As shown in **Table 8**, the certification schemes evaluated do not make any associations or references to the remaining minimum requirements. Consequently, as discussed in the previous section, the primary findings of the environmental pillar are employed to identify which minimum requirements of the circularity pillar are or are not applicable to smallholders.

Table 8. Circularity pillar - Minimum requirements applicable to smallholders. Colour code: Red colour indicates that the CSL establish that this requirement is NOT applicable to smallholders according to the CS and Green colour indicates that the CSL establish that this requirement is NOT applicable to smallholders according to the CS. MR: minimum requirement.

MR	Fair for life	Fairtrade	Rainforest	RSB	Better Biomass
EOLS-3					
EOLS-6					
EOLS-9					
PP-1					
PP-3					
PP-5					
PP-8					
PP-12					
G-1					
PMD-1					
PMD-4					
PMD-7					
CBM-1					

Regarding the minimum requirements related with the key area of "end of life stage (EOLS)", EOLS-6 refers to the inclusion of criteria and/or requirements to improve the process circularity, while EOLS-9 denotes the need to take actions to reduce waste in the production phase. With respect to smallholders, EOLS-6 is considered not applicable due to their limited training in circularity management and assessment, which hinders their awareness of circularity metrics and scoring. On the contrary, EOLS-9 aims to encourage smallholders to reduce waste production in their production processes, as inadequate waste management can have a negative environmental impact in the form of pollutants. It is believed that EOLS-9 is feasible to be applicable to smallholders.

Regarding the "production processes (PP)" key area, it has been determined that all minimum requirements identified are not covered by the certification schemes analyzed. Most of these requirements are related to the monitoring of energy and material resources, focusing mainly on the quantification of recycled or renewable materials and energy, the amount of fossil resources and secondary raw materials used. According to the CSLs outcomes on the environmental pillar analysis, these monitoring activities shall not be required to be carried out by smallholders, mostly given the need to use advanced monitoring tools and training to be aware on how these quantifications should be made. Same comments are achieved for the key area of “generic (G)”, as the minimum requirement G-1 ask for developing a strategic plan on circularity. Consequently, the minimum requirements for the PP and G key areas are not considered applicable to smallholders.

In the case of the “products and materials design (PMD)” key area, the minimum requirements selected as for implementing strategies for extended the life of products and materials used along the production processes (PMD-1), promote the use of products and materials biodegradables and compostables (PMD-4) and implement circularity principles on the design of products and materials (PMD-7). Any of these minimum requirements should be required for smallholders given (1) the reduced financial support for implementing new technologies aiming at promoting more

circular processes and (2) the lack of effective training on circularity strategies in terms of products and processes design. In line with these two statements, same applies to the key area of "circular business models (CBM)", as the minimum requirement CBM-1 aims at developing an industrial symbiosis plan.

Once analyzed and discussed all the minimum requirements and its potential application to smallholders, the summary of the ones applicable is shown in **Table 9**.

Table 9. Circularity pillar – analysis and final decision for minimum requirements applicable to smallholders. Acronyms: MR (minimum requirement), SHs (smallholders).

Requirement	Adequate MR for SHs?	Final decision – MR applicable to SHs?
EOLS-3	**No:** Separation and recycling strategies imply the availability of advanced technologies, financial support and training.	NO
EOLS-6	**No:** To include criteria and requirements for process circularity, specific training is required	NO
EOLS-9	Yes, feasible to be applicable for SHs	YES
PP-1	**No:** Measuring and implementing recycling and renewable materials could be challenging for smallholders	NO
PP-3	**No:** Monitoring and quantifying the use of fossil resources in the activities require advanced technologies and training	NO
PP-5	**No:** Monitoring and quantifying the use of renewable energies in the activities require advanced technologies and training	NO
PP-8	**No:** Monitoring and quantifying the use of secondary raw materials in the activities required advanced technologies and training	NO
PP-12	**No:** Improving energy efficiency in the process and savings targets should not be directly applicable to smallholders, and they should focus on increasing production rather than efficiency	NO
G-1	**No:** The lack of training on circularity implies that developing a strategic plan for circularity is challenging	NO
PMD-1	**No:** Implementing strategies for extending the life of products and materials used in the production processes could be challenging for smallholders due to the lack of financial support, advanced technologies and training.	NO
PMD-4	**No:** Using biodegradable products and materials in the production processes could be challenging for smallholders as it could affect production capacity and product quality	NO
PMD-7	**No:** Implementing circularity strategies in product design for smallholders could be challenging due to the lack of training and financial support.	NO
CBM-1	**No:** The promotion of industrial symbiosis should not be applicable to smallholders as the amount of waste produced is expected to not be high enough to be used by other companies as input	NO

3 Main conclusions for smallholders

3.1 Main challenges

The capacity of smallholders to adopt and advance sustainability and circularity practices faces significant challenges, such as the lack of financial incentives, limited training opportunities, restricted technological progress, and market-related constraints. As a result, it is essential to address these challenges in a way that differs from the approach taken with large companies, which can allocate part of their economic benefits towards developing sustainable and circular strategies, investing in technology, and providing worker training. Understanding these differences is crucial for designing processes and products that foster more sustainable and circular practices, as smallholders often have limited access to these resources.

An analysis of the certification schemes, policies, and regulatory frameworks in D3.3 reveals that they are primarily focused on large companies, with the specific needs of smallholders overlooked. Not all CSLs offer certification that is applicable to a smallholder setting. Especially in sectors where there is a large proportion of small-scale producers, CSLs should consider developing standards that support stepwise improvement or continuous compliance models, and that can be used for a group of actors instead of individual producers. CSLs should also see to introduce market incentives such as price premiums to reward the effort of small-scale producers of improving or reaching the desired level performance. It is likely that support mechanisms might be need, such as capacity building, information services, decision-making tools, access to inputs and technology and financial support and services (ISEAL, 2020).

In this regard, this D3.4 report seeks to examine whether the minimum requirements of CSLs that are applicable to larger production facilities could also be relevant to smallholders. In general, the primary obstacle for smallholders is their limited access to financial resources, which is essential for implementing sustainability and circularity in areas such as infrastructure, equipment development, process design, and end-of-life strategies.

When analysing minimum requirements, it becomes clear that the majority involve monitoring activities related to input and output flows—particularly in environmental and circular areas—along with the assessment of factors to ensure long-term viability (economic) and actions to ensure stakeholder benefits (social). The multidimensional nature of sustainability and circularity requires the integration of suitable mechanisms to make these requirements applicable to smallholders. For instance, the lack of adequate training and knowledge transfer among smallholders suggests that they will likely continue using conventional, non-innovative production methods that are often less sustainable. This can lead to inefficient resource use and environmental degradation.

The economic dimension is also crucial. Smallholders typically operate with narrow financial margins, making it difficult for them to invest in advanced technologies, monitoring tools, or sustainable practices that don't offer immediate economic returns. This presents a significant risk to the economic viability of their processes. From a social perspective, smallholders often face difficulties in accessing relevant value chain networks, cooperatives, and certification opportunities. These challenges hinder their ability to enhance market access and promote fair and equitable working conditions.

Regarding circularity, most strategies require deep knowledge of advanced and emerging technologies to assess circular actions such as recovery strategies, product repurposing, recycling flows, and waste reduction. Furthermore, the application of advanced tools like life cycle assessments, material flow analysis, or digitalized monitoring systems is necessary. These are complex methods that require expert integration, which, without financial support, is unattainable for smallholders. As a result, smallholders are often unable to implement circular strategies in their production systems. In this regard, CSLs are encouraged to provide training on applicable circular strategies such as waste management, and measurement of input and outflow of material as part of the sustainability performance of the production process. This might require the design of simplified, low-cost monitoring tools to collect the necessary data. It is worth noting that the ability of small-scale producers to adopt sustainable practices and secure fair and resilient livelihoods is influenced by the wider context in which they operate. CSLs should not be expected to deliver change on their own.

Without appropriate support from policies, government, stakeholders, or larger companies, smallholders' transition to a circular economy remains severely limited. Without targeted interventions, such as access to affordable technologies, training programs, and the development of local collaborative networks, smallholders are likely to continue relying on linear production models. This reliance leads to inefficiencies, resource scarcity, environmental burdens, and a loss of economic benefits.

3.2 Potential solutions for smallholders' challenges

Once identified the actual challenges for smallholders looking to move forward more sustainable and circular production strategies, this section 3.2 aims at proposing some potential solutions that could be applicable to be able to face those challenges. These solutions should be provided from range of stakeholders, such as governments, research institutions and civil society administrations.

1. *Training and knowledge transfer on sustainability and circularity (stakeholders' groups that should provide this training: public authorities, government agencies, research institutes, NGOs or development organizations)*
    a. Provide simpler assessment tools, which could be directly applicable with input and output flows values, so adapted to small-scale operations, to give an idea on the environmental, economic, social and circular performance of the production processes.
    b. Bring the possibility of access to training programs without fees, offering practical seminars or workshops on sustainable and circular strategies, mostly focused on waste reduction and management strategies, as it could be the key aspect for smallholders, rather than quantifying GHG emissions, for example, that could be more challenging.
2. *Financial incentives for having access to advanced technologies and infrastructures (stakeholders' groups that should provide financial incentives: government bodies, public institutions, development agencies, as the World Bank for example or private cooperatives)*
    a. Provide access to low-cost circular techniques or technologies that can be easily applied and implemented by smallholders. One example could be providing data monitoring tools to collect the necessary data to track input and output flows throughout the process and begin monitoring activities, as required by most of the minimum requirements analysed in this D3.4.

   b. Introduce the option of subsidies or microfinancing, such as grants or tax reductions, to help smallholders invest in advanced technologies, circular strategies, or sustainable practices.
3. *Policy support (stakeholders' groups that should provide policy support: national governments, local governments, municipal authorities, legislative bodies, policymakers)*
   a. It is essential that policymakers take the capabilities of smallholdings into consideration when developing action plans. These plans must establish clear short- and long-term objectives that are adapted to the production, economic, and logistical capabilities of smallholdings.
   b. Policies should also consider that the advancement of smallholders in sustainability and circulation aspects should be flexible and progressive, thus within a long-term perspective.

4. *Strengthen collaboration between smallholders and enhance their market access (stakeholders' groups that should enhance collaboration: sectorial cooperatives, local authorities, development agencies, research institutes)*
   a. Create partnerships with larger companies of the value chain aiming at providing technical support and resources for allowing a quicker market access.
   b. Simplify the certification and ecolabelling processes and requirements for smallholders for making them more accessible.

4 Conclusions

The Deliverable D3.4 has analysed the applicability of minimum requirements from certification schemes and labels to smallholder activities, with the goal of ensuring the inclusivity of smallholders in sustainability and circularity efforts. While minimum requirements are crucial for measuring, monitoring, and ensuring sustainability and circularity practices among actors and activities in the value chain, flexibility is needed to accommodate the diverse contexts faced by smallholders. Consequently, more attainable criteria and requirements should be established for smallholders, while simultaneously providing support to help integrate them into certified supply chains.

In this regard, of the 19 certification schemes examined in D3.3, only 5 consider smallholders in their criteria and requirements, which highlights the lack of attention given to these actors in certification schemes. Furthermore, when it comes to minimum requirements, it is sometimes unclear whether a requirement should be applied to smallholders, given the lack of synergy between certification schemes (e.g., one scheme may not require a specific requirement for smallholders, while another may mandate it).

With this in mind and recognizing that the environmental pillar showed the greatest inclusion of smallholder perspectives, several conclusions regarding the nature and applicability of minimum requirements to smallholders have been drawn. These conclusions also helped inform the applicability of such requirements within the other sustainability and circularity pillars. In the end, a total of 14 minimum requirements are applicable to smallholders out of the 43 identified in D3.3: 7 in the environmental pillar, 5 in the social pillar, 1 in the economic pillar, and 1 in the circularity pillar.

Although the number of applicable minimum requirements for smallholders may seem low, it is important to note that most of the minimum requirements identified in D3.3 involve monitoring, indicator calculations, and action plan development. These activities require not only specific technology but also proper training in technical advancements, sustainability, and circularity assessments, as well as adequate financial support, which is generally beyond the reach of smallholders.

Therefore, it can be concluded that future efforts should focus on developing monitoring tools and certification schemes that reduce barriers for smallholders, such as simplified certification processes, training programs, financial incentives, and technological support. By addressing these issues, smallholders will be better equipped to improve sustainability and circularity practices, gain access to new market opportunities, and contribute to broader sustainability and circularity goals.

5 Appendix

A.1 Minimum Requirements identification codes for the environmental pillar

ENVIRONMENTAL PILLAR

Key Area - **Climate change**	
EN-CC-1	The certification scheme shall require having a plan/policy in place on GHG emissions, mitigation strategies and adaptation measures to climate change.
EN-CC-2	The certification scheme shall require quantifying lifecycle GHG emissions and specify the methodology that should be followed.
EN-CC-3	The certification scheme requires GHG emissions to be reduced between specified periods.

Key Area - **Water**	
EN-W-1	The certification scheme shall include requirements to prevent surface water and ground water contamination
EN-W-2	The certification scheme shall require the monitoring and impact assessment of the quality of surface and/or ground water
EN-W-4	The certification scheme shall require practices to improve water quality
EN-W-8	The certification scheme shall require water use reduction practices

Key Area - **Soil**	
EN-S-1	The certification scheme shall require practices that conserve and enhance soil quality

Key Area - **Biodiversity**	
EN-B-3	The certification scheme shall include requirements on the use of alien invasive species
EN-B-5	The certification scheme shall require operators have a plan on biodiversity conservation
EN-B-6	The certification scheme shall require monitoring and assessing the impact on biodiversity
EN-B-7	The certification scheme shall require operators to implement strategies and actions of spatial management to protect ecosystems
EN-B-8	The certification scheme shall require operators to implement practices to restore or rehabilitate natural habitats and/or ecosystems
EN-B-9	The certification scheme shall include requirements to ensure legally protected and internationally recognized protected areas are respected

Key Area – **Natural resources**	
EN-NR-1	The certification scheme shall include requirements on sustainable consumption of abiotic resources
EN-NR-4	The certification scheme shall require sustainable management practices of biotic resources
EN-NR-7	The certification scheme shall require operators to use of sustainably sourced resources

Key Area – **Hazardous substances**	
EN-HS-1	The certification scheme shall require assessing the impact on human health of the business activities
EN-HS-3	The certification scheme shall include requirements for waste management
EN-HS-6	The certification scheme shall require practices that use hazardous chemicals in a selective and targeted manner

Key Area - **Generic**	
EN-G-1	The certification scheme shall require operators to receive instruction and training in sustainable practices

A.2 Minimum Requirements identification codes for the circularity pillar

CIRCULARITY PILLAR

Key Area – **End-of-life-stage**	
CR-EoLS-3	The certification scheme shall require operators to separate and recycle waste
CR-EoLS-6	The certification scheme shall include criteria/requirements to improve process circularity
CR-EoLS-9	The certification scheme shall include criteria to take actions to reduce waste on the production phase

Key Area – **Circular business model**	
CR-CBM-1	The certification scheme shall require identification of strategies between process schemes to promote industrial symbiosis

Key Area – **Generic**	
CR-G-1	The certification scheme shall require a strategic plan on circularity

Key Area – **Production processes**	
CR-PP-1	The certification scheme shall require measures to increase the use of recycled and renewable materials
CR-PP-3	The certification scheme shall require quantifying the percentage of fossil resources used in the activity, considering both materials and energetic sources
CR-PP-5	The certification scheme shall require the quantification of the percentage of renewable energies used
CR-PP-8	The certification scheme shall require measurements on the use of secondary raw materials as input resources
CR-PP-12	The certification scheme shall require operators to establish, implement and maintain an appropriate system to improve energy efficiency. It shall include the identification of technologies and equipment to improve energy efficiency in the process and savings targets

Key Area – **Products and materials design**	
CR-PMD-1	The certification scheme shall require operators to implement strategies to extend the life of the products and materials produced
CR-PMD-4	The certification scheme shall require products and materials to meet specific criteria regarding biodegradability, easy disintegration, and the potential for composting
CR-PMD-7	The certification scheme shall require operators implement circularity strategies on their products and materials designs

A.3 Minimum Requirements identification codes for the economic pillar

ECONOMIC PILLAR

Key Area – **Economic risks**	
E-ER-1	The certification scheme shall require operators to document and quantify all the economic related items to evaluate the long-term economic viability of the process

Key Area – **Long-term investment**	
E-LTI-4	The certification scheme shall require operators to document and identify the economic expenditures on innovation and sustainable strategies

A.4 Minimum Requirements identification codes for the social pillar

SOCIAL PILLAR

Key Area – **Local community**	
SOC-LC-5	The certification scheme shall require measures taken to address local employment, including indigenous peoples

Key Area – **Society**	
SOC-SO-3	The certification scheme shall require measures to improve and ensure local food security or an assessment on impact on this to identify and reduce risks

Key Area – **Workers**	
SOC-WO-1	The certification scheme shall require compliance with the minimum age for work as defined by applicable national legal requirements or the age of completion of compulsory education, or the prohibition of child labour
SOC-WO-4	The certification scheme shall include criteria on equal opportunities or discrimination
SOC-WO-6	The certification scheme shall require operators to implement measures to safeguard rights relating to forced labour, considering both physical or psychological violence against workers
SOC-WO-9	The certification scheme shall require the presence of adequate protection measures are in place to ensure that the workers safety is guaranteed
SOC-WO-11	The certification scheme shall have requirements related to working hours and rest periods; worker representation and communication; training; overtime compensation; flexible working conditions; grievance mechanisms

6 References

Beall, E. (2012). Smallholders in global bioenergy value chains and certification. Environment and Natural Resources Management. Working Paper (FAO), (50).

Bitzer, V., & Steijn, C. (2019). The impact of voluntary sustainability standards on small-scale farmers in global commodity chains. The Netherlands: KIT Royal Tropical House.

Cantelmo, G., Amini, R. E., Monteiro, M. M., Frenkel, A., Lerner, O., Tavory, S. S., ... & Antoniou, C. (2022). Aligning users' and stakeholders' needs: How incentives can reshape the carsharing market. Transport Policy, 126, 306-326.

FAO, 2013. Smallholders and family farmers. Retrieved from https://openknowledge.fao.org/server/api/core/bitstreams/5ed2c62d-f6aa-4165-b05d-d1fddb1ab352/content

FAO, 2021. Small family farmers produce a third of the world's food. Retrieved from https://www.fao.org/newsroom/detail/small-family-farmers-produce-a-third-of-the-world-s-food/en#:~:text=Five%20of%20every%20six%20farms,study%20published%20in%20World%20Development

FAO, 2025, SDG Indicators Data Portal. Retrieved from https://www.fao.org/sustainable-development-goals-data-portal/data/indicators/average-income-of-small-scale-food-producers-by-sex-and-indigenous-status/en#:~:text=

García-Sánchez, I. M., Somohano-Rodríguez, F. M., Amor-Esteban, V., & Frías-Aceituno, J. V. (2021). Which region and which sector leads the circular economy? CEBIX, a multivariant index based on business actions. Journal of Environmental Management, 297, 113299.

Ho, O. T. K., Gajanayake, A., & Iyer-Raniga, U. (2023). Transitioning to a state-wide circular economy: Major stakeholder interviews. Resources, Conservation & Recycling Advances, 19, 200163.

IEEP, 2022. Securing the position of smallholders in zero-deforestation supply chains. Retrieved from https://ieep.eu/wp-content/uploads/2022/11/Securing-the-position-of-smallholders-in-zero-deforestation-supply-chains-IEEP-2022-1.pdf

IFAD, U. (2013). Smallholders, food security and the environment. Rome: International Fund for Agricultural Development, 29.

ISEAL. Choosing effective strategies to drive sustainability improvements. 2020 (https://isealalliance.org/sites/default/files/resource/2021-06/ISEAL_Enabling%20Conditions%20Guidance%20Document%202020_V6AltCover.pdf)

Khan, M., Papadas, D., Arnold, L., & Behrendt, K. (2024). Sustainability challenges in the multi-tier crop agri-food sector: a systematic review. Agricultural and food economics, 12(1), 25.

Marx, A., Depoorter, C., & Vanhaecht, R. (2022). Voluntary sustainability standards: state of the art and future research. *Standards*, *2*(1), 14-31.

Meemken, E. M. (2020). Do smallholder farmers benefit from sustainability standards? A systematic review and meta-analysis. *Global Food Security*, *26*, 100373.

Munaro, M. R., & Tavares, S. F. (2023). A review on barriers, drivers, and stakeholders towards the circular economy: The construction sector perspective. Cleaner and Responsible Consumption, 8, 100107.

NDC partnership. (2024) Whole-of-society approaches to inclusive stakeholder engagement. Best practice brief. World Resources Institute.

Ricciardi, V., Ramankutty, N., Mehrabi, Z., Jarvis, L., & Chookolingo, B. (2018). How much of the world's food do smallholders produce?. Global food security, 17, 64-72.

Rode, J., Wittmer, H., Emerton, L., & Schröter-Schlaack, C. (2016). 'Ecosystem service opportunities': A practice-oriented framework for identifying economic instruments to enhance biodiversity and human livelihoods. Journal for nature conservation, 33, 35-47.

Ros-Tonen, M. A., Bitzer, V., Laven, A., de Leth, D. O., Van Leynseele, Y., & Vos, A. (2019). Conceptualizing inclusiveness of smallholder value chain integration. Current Opinion in Environmental Sustainability, 41, 10-17.

Sagie, H., & Orenstein, D. E. (2022). Benefits of Stakeholder integration in an ecosystem services assessment of Mount Carmel Biosphere Reserve, Israel. Ecosystem Services, 53, 101404.

Schoneveld, G. C., & Weng, X. (2023). Smallholder value creation in agrifood chains: Value network approach. Land Use Policy, 131, 106676.

Takacs, F., Brunner, D., & Frankenberger, K. (2022). Barriers to a circular economy in small-and medium-sized enterprises and their integration in a sustainable strategic management framework. Journal of Cleaner Production, 362, 132227.

Velenturf, A. P., & Purnell, P. (2021). Principles for a sustainable circular economy. Sustainable production and consumption, 27, 1437-1457.

Star4bbs

"Sustainable bio-based systems via effective certification & labelling"

Consortium:

Funded by the European Union

www.star4bbs.eu
info@star4bbs.eu

@STAR4BBS