

Advanced Sustainable BIOfuels for Aviation

Deliverable 4.5:

Socio-economic sustainability assessment

Consortium:

Acronym	Legal entity	Role
RE-CORD	CONSORZIO PER LA RICERCA E LA DIMOSTRAZIONE SULLE ENERGIE RINNOVABILI	CO
ENI	ENI S.p.A.	BEN
SKYNRG	SKYENERGY BV	BEN
CENER	FUNDACION CENER-CIEMAT	BEN
ETA	ETA – Energia, Trasporti, Agricoltura Srl	BEN
CCE	CAMELINA COMPANY ESPANA S.L.	BEN
JRC	JOINT RESEARCH CENTRE – EUROPEAN COMMISSION	BEN

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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 789562.

General Information

Call identifier: H2020-LCE-2017-RES-IA
 GA Number: 789562
 Topic: LCE-20-2016-2017
 Start date of project: 01/05/2018
 Duration: 5 years (30/06/2023)
 Work Package: WP4 – Evaluation
 Type: Deliverable
 Number: D4.5
 Title: Socio-economic sustainability assessment
 Due Date: 31/12/2022 (December)
 Submission date: 27/04/2023
 Reference Period: 30/04/2021 – 30/06/2023
 Prepared by: RE_CORD (Lead), CENER
 Responsible Person: Juan Felipe Bermeo
 Dissemination Level: Public

INTERNAL MONITORING & REVISION TABLE					
REV.	DATE	DESCRIPTION	PAGES	CHECKED	APPROVED
0	23-12-2022	First draft CENER	36	JFB	
1	05-01-2023	First revision	36	TB	
2	03-02-2023	Second draft CENER– Implemented comments	40	JFB	
3	24-02-2023	Final draft for revision	45	JFB	
4	27/04/2023	Final Version	45	JFB	YES

Document Type		
PRO	Technical/economic progress report (internal work package reports indicating work status)	
DEL	Technical reports identified as deliverables in the Description of Work	X
MoM	Minutes of Meeting	
MAN	Procedures and user manuals	
WOR	Working document, issued as preparatory documents to a Technical report	
INF	Information and Notes	

Dissemination Level		
PU	Public	X
PP	Restricted to other programme participants (including the Commission Services)	

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1 Summary

The document is part of task 4.4, under work package 4 (WP4) of the Bio4A project, where the social impact is assessed during the production of Sustainable Avion Fuel using Used Cooking Oil and animal fats (tallow cat.1 and 2) as the main feedstock, and Camelina Sativa Oil as a potential feedstock . For this, a review of methodologies and certification labels was conducted.

Methodologies

- United Nations Environment Programme
- Product Social Impact assessment

Certifications

- Roundtable on Sustainability Biomaterials – RSB CORSIA Certification
- International Sustainability Et Carbon Certification - ISCC CORSIA Certification
- Roundtable on Sustainability Palm Oil – RSPO Certification

With the information gathered from the previous analyses, an adapted Bio4A methodology was structured to carry out this report. The study made it possible to analyse the social impact of the different partners and their value chains. Of the 15 indicators analysed, in general terms, for all the partners and their respective indicators, the results were medium, low, and very low risk. This categorisation made it possible to know the positive and negative impacts. Positive impacts indicate that the partners and their value chains are doing all their operations in a socially correct way, while negative impacts, allow the organisation to take corrective actions and improve its value chain environment.

2 Introduction

Knowing the social impact related to the manufacture of products or provision of services by different environments, such as organisations, political sectors, and citizenship, has had significant growth in recent years. The Social Life Cycle Assessment (SLCA) is a method that seeks to analyse social and socio-economic impacts from two points of view, both positive and negative, considering the value chain and its actors (UNEP, 2020). Although there is no standardised methodology for this study, given that it is a subject that is still under development, for the SLCA, the ISO 14044 standard has sometimes been used as a reference, which has an environmental evaluation approach (ISO 14044, 2006). From there, methodologies and certification labels have emerged that aim to carry out the SLCA taking the environmental impact as a reference, and capturing the social impact (ISCC, 2021; Roundtable on Sustainable Biomaterials, 2021), although, unlike environmental impacts, social impacts are not easy to quantify (Manik, Leahy, & Halog, 2013).

Life cycle assessment (LCA) is a methodology used worldwide for estimating the impacts of a given economic activity, a company or a product/service throughout its life cycle (Hauschild, M. Z., Rosenbaum, R. K., & Olsen, 2018). A SLCA is defined as a social impact (and potential impact) assessment technique that aims to assess the social and socio economic aspects of products and their potential positive and negative impacts along their life cycle. The socioeconomic aspects evaluated in SLCA are those that can directly affect to stakeholders positively or negatively during the life cycle of a product or organization. In this way, SLCA is a good tool to complement environmental LCA with social and socioeconomic aspects.

Comparing with other social tools, SLCA has an overview of social impacts that the life cycle of a product could produce due the “cradle to grave” boundaries. This holistic method gives a more complete assessment to make decisions between product alternatives and to identify hotspots (Jørgensen, 2013; Norris et al., 2014). On the other hand, from the perspective of some authors such as Dreyer et al., (2006); Spillemaeckers, S., Vanhoutte, G., Taverniers, L., Lavrysen, L., van Braeckel, D., Mazijn, B., & Rivera, (2004), the impact of the social life cycle is not directly related to the production process carried out by the companies, but instead to the behaviour of the companies in carrying out their processes.

Social analysis is gaining more and more weight, which is why the number of studies that include it in their life cycle analysis is increasing. These social life cycle analyses have been conducted for different products and processes, some examples are; a solar power plant in Spain (Corona et al., 2017), building materials (Hosseinijou et al., 2014) ,sugar cane cultivation in South Africa (Nemarumane, T. M., & Mbohwa, 2013), production of palm oil biodiesel in Indonesia (Manik, Leahy, & Halog, 2013), and the sugar industry in Thailand (Prasara-A & Gheewala, 2018).

Finally, the aim of this deliverable is to analyse the social impact associated to the production of sustainable aviation fuel (SAF) in Europe, obtained on one hand from residual lipids such as Used Cooking Oil (UCO), and animal fats (tallow cat.1 and 2) because these feedstocks have the advantages of being novel, low environmental emissions (Caretta et al., 2021) , and high standard products (van Grinsven et al., 2020), and the other hand with an energy crop as Camelina Oil (CO), due to their characteristics of high oil content in their seeds, high net energy ratio, and low production cost (Moser, 2010).

2.1 Comparison of methodologies

Due to the fact that the social dimension plays an important role in the evaluation of sustainability, and since there is no commonly agreed methodology, an exhaustive analysis of the different methodologies and certifications that take into account the social aspects has been carried out. All the social indicators included in each of them have been analyzed and compared in order to select the methodology considered to be the most complete and effective. Factors that have been interesting from other methodologies have also been included, developing a methodology based on the UNEP and Product Social Impact Assessment Guidelines but adding them.

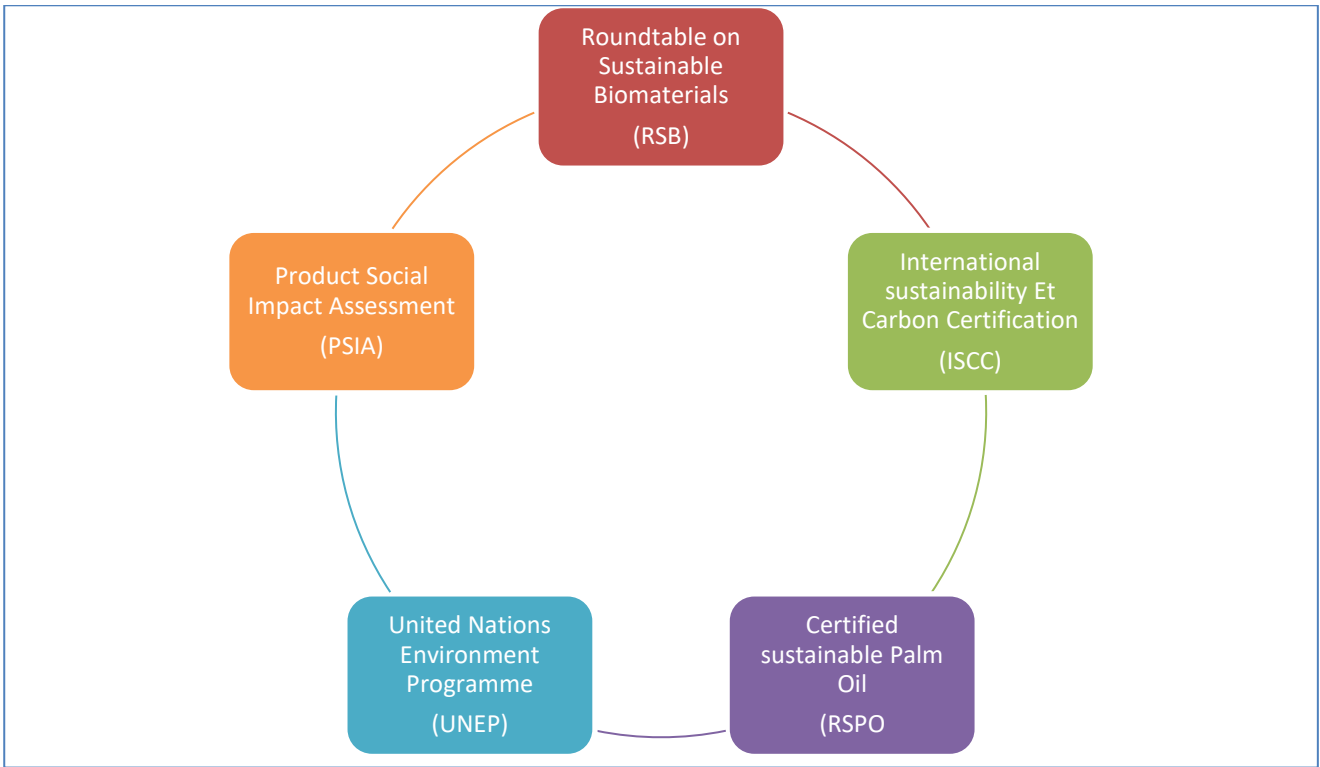


Figure 1. Methodologies and certifications analysed in the study.

Thus, the sustainability schemes of some important certifications related with biofuels have been analyzed (Figure 1) to see the social indicators included in their certification criteria according with the different impact categories: **Human and labour rights, rural and social development, local food security, land rights, working conditions, health and safety, cultural heritage, governance and socio economic repercussions**, (further information about categories can be found in section 4.1.3). In addition, the Guidelines for social life cycle assessment developed

by UNEP, considered as a reference guide for many Social Life Cycle Assessment studies, have been analyzed.

It should be noted that the plan of Carbon Offsetting and Reduction Scheme for International Aviation (CORSA) was also analyzed initially, but has not been included in the study because it mainly focuses on environmental aspects.

2.1.1 RSB CORSIA Certification

The Roundtable on Sustainable Biomaterials (RSB) is a global, multi-stakeholder independent organisation that drives the development of a bio-based and circular economy on a global scale through sustainability solutions, certification, and collaborative partnerships. This organization carries out various certifications but this study focuses on RSB **Carbon Offsetting and Reduction Scheme for International Aviation (CORSA) Certification**. This certification is for use by feedstock producers, refineries and traders globally to certify CORSIA Sustainable Aviation Fuels (SAF). The RSB CORSIA Standard, supports the sector leaders to demonstrate that they are complying the specifies requirements under the CORSIA, making aviation leaders Greenhouse Gas (GHG) reductions and other important sustainability aspects such as food security, environmental protection and human rights.

This certification is based on 12 principles which include environmental, social and economic criteria. Each of these principles has different criteria and minimum parameters to meet for each of them. Those principles and criteria of social scope have been studied and analyzed to include them in the assessment (Figure 2). According to the methodology developed by UNEP/SETAC **this certification focuses on the impact on workers, local community and society.**

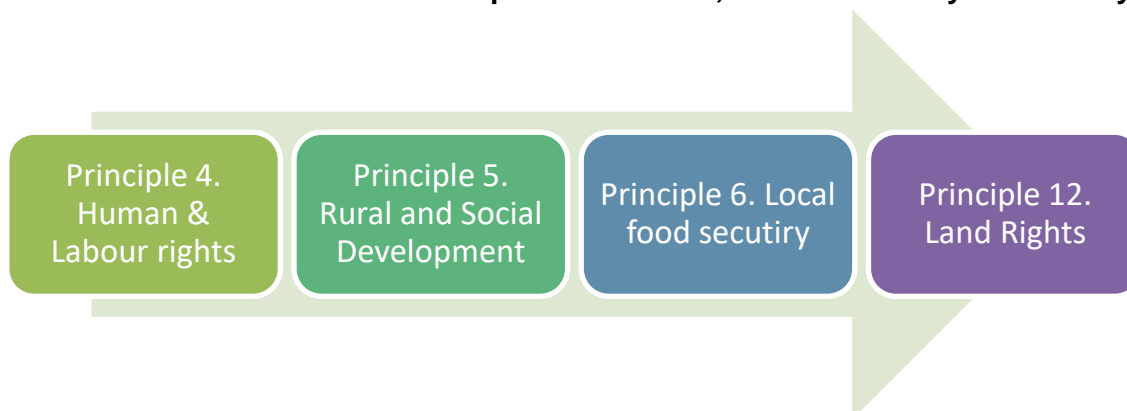


Figure 2. RSB CORSIA Social Principles.

2.1.2 ISCC CORSIA Certification

Similar to previous one, International Sustainability Et Carbon Certification (ISCC) supports the CORSIA approach with its well-experienced certification system. ISCC is an independent multi-stakeholder organization that provides a globally applicable certification system for sustainability of raw materials and products, traceability through the supply chain and the determination of greenhouse gas emissions and savings. The ISCC CORSIA Training provides precise insights on the legal framework of CORSIA, SAF certification processes and sustainability requirements.

Biomass used in SAF production under CORSIA should be produced in a sustainable way, following the production of biomass should follow best environmental, social and economic practices.

This certification is based on six principles; three of them have a social character, and analyze impact categories such as safe working conditions, compliance with human and labour rights and compliance with laws and international treaties. Each of these principles has a series of indicators and minimum requirements to meet, which have been analyzed through the ISCC public reports and audit verification guidelines.

2.1.3 RSPO Certification

Roundtable on Sustainable Palm Oil (RSPO) is a certification that guarantees the sustainability of palm oil; it ensures that the production of this oil has been carried out in a sustainable way. Palm oil producers are certified through strict verification of the production process according to RSPO principles and criteria. These principles encompass the impacts on prosperity, people and planet. In this study, the principles that generate an impact on society have been analyzed (Figure 3).



Figure 3. Structure of the RSPO Principle on impact society

2.1.4 UNEP Methodology

Guidelines in performing a socio-economic life cycle assessment (SLCA) as a complement to environmental LCA within the context of sustainable development have been published by the United Nations Environment Programme (UNEP/SETAC, 2009). In 2009 UNEP’s Life Cycle Initiative launched the first Guidelines for Social Life Cycle Assessment (SLCA). Since then, researchers and practitioners have used these Guidelines to assess the positive and negative social and socio-economic impacts of products over their lifecycle. In 2020 they went further and made a new edition that also looks at how to link the social impacts of a product’s production and consumption to the larger impacts associated with an organization’s influence across the life cycle of a product (UNEP, 2020). Taking into account that the methodology described in the

UNEP / SETAC guidelines is largely based on the E-LCA ISO 14040 and 14044 methodology, it also consists of four interconnected phases (Figure 4): **Goal and scope; Inventory analysis; Impact assessment; and interpretation.**

Unlike environmental impacts, many social impact indicators are not easily quantifiable, therefore an extensive qualitative or semi-quantitative data collection is required, something difficult to achieve because these types of indicators are often subjective and they must be handled by qualified experts. This makes SLCA to be less utilized as a decision support tool. However, the SLCA has already been applied to different services and products in a satisfactory way.

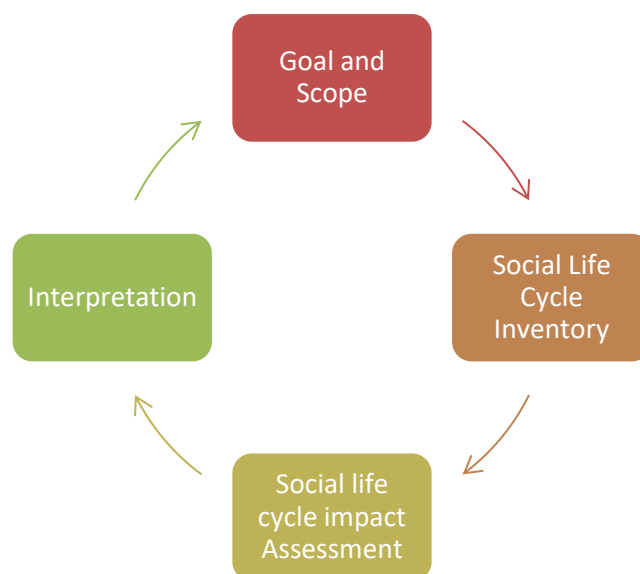


Figure 4. Phases of SLCA

In order to have a better understanding of SLCA, the phases of the SLCA are explained in the following paragraphs:

- 1- **Goal and Scope:** The goal of the study should clarify the intention of the assessment and what is aiming to analyze. Also it specifies which are the people interested in SLCA's results or to whom is it directed. The intent of the study could be broad: product comparison, to obtain information or knowledge about a product to educate stakeholders on social impacts and identify social hotspots.

The scope gives us the idea of how deep, extensive and wide is the study. It presents the limits of the life cycle and also of the detailed information to be selected and evaluated. It presents the source and places where the data will be selected, how to treat the information, and where the outcomes will be applied

- 2- Social Life Cycle Inventory: One of the most demanding tasks in performing a SLCA is the inventory of data, due to poor availability and accessibility of data on social and socio-economic issues in a relevant form.
- 3- Social Impact Assessment: the SLCA is the phase where subcategories and impact categories are selected, and where models and methods are defined. Other steps in SLCIA are the 'classification', which consists of relating the inventory data with the subcategories and impact categories selected before, and the 'characterization' where the practitioners assign a result for the subcategory indicators (UNEP/SETAC 2009).

The selection of the subcategories, impact categories and indicators and the determination of the methods and models should be according the goal and scope described in the first phase of SLCA (UNEP/SETAC 2009)

- 4- Interpretation: When the study's iterative process is concluded, the results of the SLCA phase are checked and discussed in depth. This discussion forms a basis for conclusions, recommendations and decision-making in accordance with the Goal and Scope definition.

2.1.5 PRODUCT SOCIAL IMPACT ASSESSMENT

The purpose of the Product Social Impact Assessment (PSIA) methodology is the positive and negative assessment of the social impacts associated with products or services, It is said to evaluate positively and negatively, as it allows companies to know where their strengths and weaknesses lie. This assessment takes into account the following stakeholders:



Figure 5. Stakeholders included in PSIA

Regarding workers and small entrepreneurs, the work directly related to the product within the value chain, such as manufacturing, is considered. On the part of local communities, it is regarded as the people who are indirectly impacted by the product, given that they live in environments that are representative of the life cycle of the products—finally, the users, who are responsible for the use of the products or services.

To carry out the social impact assessment, the PSIA is composed of four key elements, as shown in figure 6, the first of which, as mentioned above, are the stakeholders; the second,

social issues, such as health and safety, child labour, land rights, among others; the third, the development of indicators, and finally, the assessment and interpretation of the impacts, using the scale reference on a scale of -2 to +2.

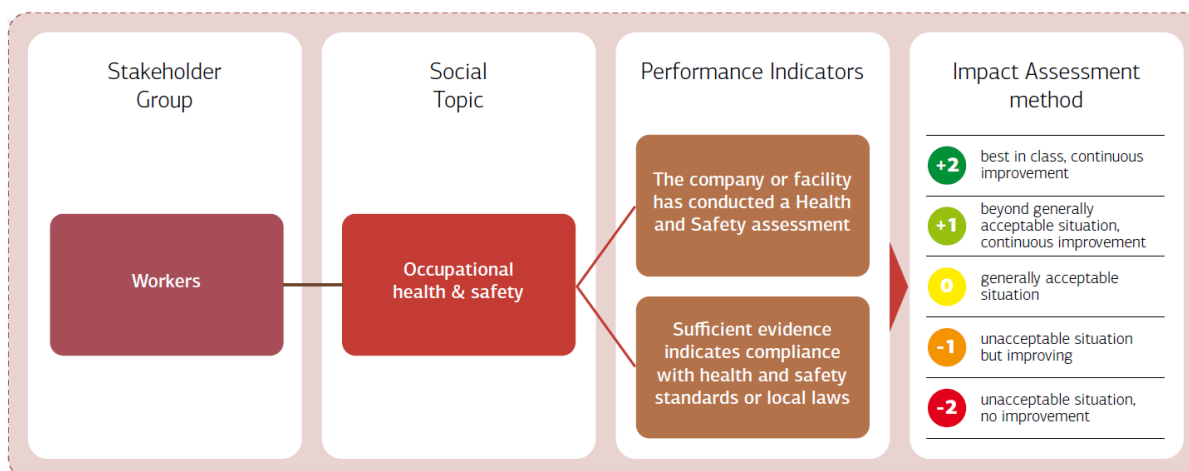


Figure 6. Key components of PSIA Methodology. From RPSIA (2015)

3 Bio4A value chain

Decarbonisation plays an essential role in business activities. The aviation sector is making progress on this issue by generating alternative fuels to fossil fuels. The use of SAF can contribute positively to the environment and social aspects. However, from an economic perspective, there is still much to be explored, as the costs associated with producing SAF are higher than traditional fuel (Shahriar & Khanal, 2022). The reason is that fossil fuel production has developed mature technology, the economy of scale, low feedstock costs, structured value chains, etc (Martinez-Valencia et al., 2021; Silalertruksa et al., 2012). But there are other fundamental aspects of the production of renewable and traditional fuels, and that is that the latter has a high cost for society and the environment, as they affect human health and ecosystems, among other (Schipper et al., 2001), which is why it is important to strengthen the production of clean fuels. In addition, the benefits that can be generated throughout the value chain can positively impact society (Figure 7), with the generation of jobs, growth of rural communities, and the environment of ecosystems, among others.

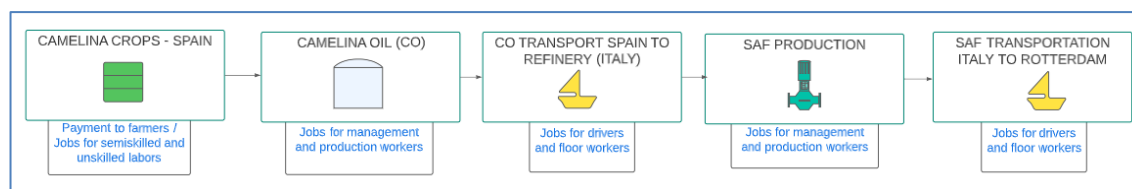


Figure 7. Positive impact on society by SAF production

The aviation sector generated around 2% of total CO2 emissions in 2021 (IEA, 2021), making it a major global emissions generator, and generating three times more emissions than railways and buses (Capaz et al., 2021). Different scenarios are proposed to mitigate these impacts produced by the sector, such as improvements in aircraft structure, engine efficiency, and the

use of SAF, among others. Regarding SAF, the production is still under development but its use is expected to increase from 0.1% in 2021 to at least 10% by 2030 (IEA, 2022).

To produce SAF, a variety of feedstocks are available, such as UCO and CO. The process for each of these is explained below.

3.1 Used Cooking Oil

Within the value chain of used cooking oil, there are two essential actors, Company 1 (C1), company 2 (C2).

The collection of used cooking oil is a relatively simple process, as shown in Figure 8. It starts with the collection process; for this, collection centres or clean points are established within the territory; once the collection process has passed, in Italy, the UCO:

- is processed by authorized companies to realize the ed-of-waste (mainly through centrifugation and/or settling)
- at the end of this preliminary process is recognized as R-UCO (regenerated used cooking oil) and
- is transported by land to the refinery, where the entire transformation process is carried out to convert it into SAF¹. The following process consists of transporting it by ship to the destination, and once there, it is transported by pipeline to the final destination.

In the first scenario that has been proposed two (C1 and C3) of the three actors play a fundamental role, transport, collecting and process in refinery.

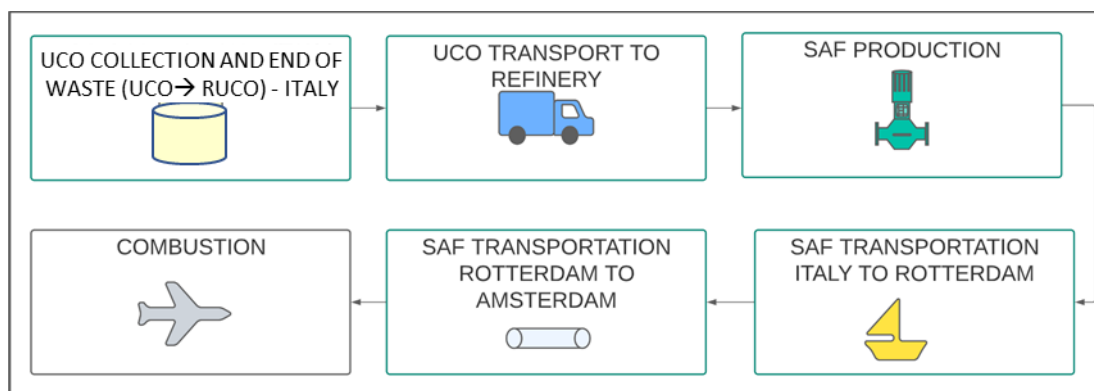


Figure 8. Bio4A value chain (Feedstock: UCO/RUCO)

3.2 Animal fat cat. 1 and 2²

Within the value chain of tallow category 1 and 2 there are two essential actors, Company 1 (C1), company 2 (C2).

¹ In particular SAF production is splitted on two sites: UCO is transformed into HVO naphtha long cut in Gela refinery and then sent by cargo to Livorno refinery where SAF is distilled.

² To be more specific Tallow (fat coming from beef): Category 1 and 2 refers to fat animals that cannot be used for feed and food due to contamination and diseases of the livestock.

The collection of animal fat (tallow) is a relatively simple process, as shown in Figure 9. It starts with the collection process; for this, collection centres or clean points are established within the territory; once the collection process has passed, the animal fat is collected by a vessel and transported by sea to the refinery, where the entire transformation process is carried out to convert it into SAF³. The following process consists of transporting it by ship to the destination, and once there, it is transported by pipeline to the final destination.

In the first scenario that has been proposed two (C1 and C3) of the three actors play a fundamental role, transport, collecting and process in refinery.

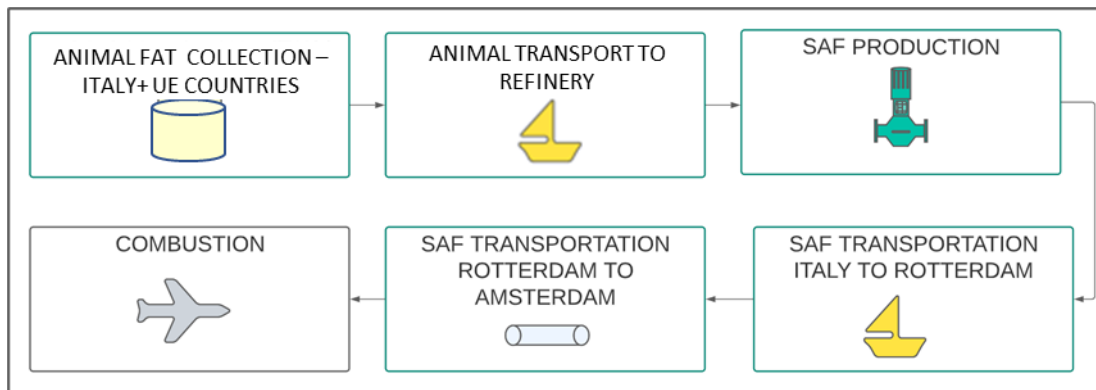


Figure 9. Bio4A value chain (Feedstock: animal fat)

3.3 Camelina Oil

Camelina sativa is an herbaceous plant that has generated worldwide interest due to its oil's capacity to produce SAF and other products such as biodiesel, lubricants and additives (Moser, 2010; Stamenković et al., 2021). In addition, it can reproduce under stressful conditions, has a short growing cycle, and reproduces in soils that are not very fertile (Moser, 2010; Stamenković et al., 2021; Yuan & Li, 2020). Due to the above, it is considered a potential feedstock for this project, and its possible supply chain is describes as follows.

Within the value chain of CO, there are three essential actors, C1, company 2 (C2), and C3.

In the case of Camelina, it is a similar process to the previous one, but in this case, the starting point begins in the cultivation of Camelina, which is later converted into oil, and then transported to the refinery, from here it follows the same steps as UCO and animal fats (figure 10).

³ See note 1

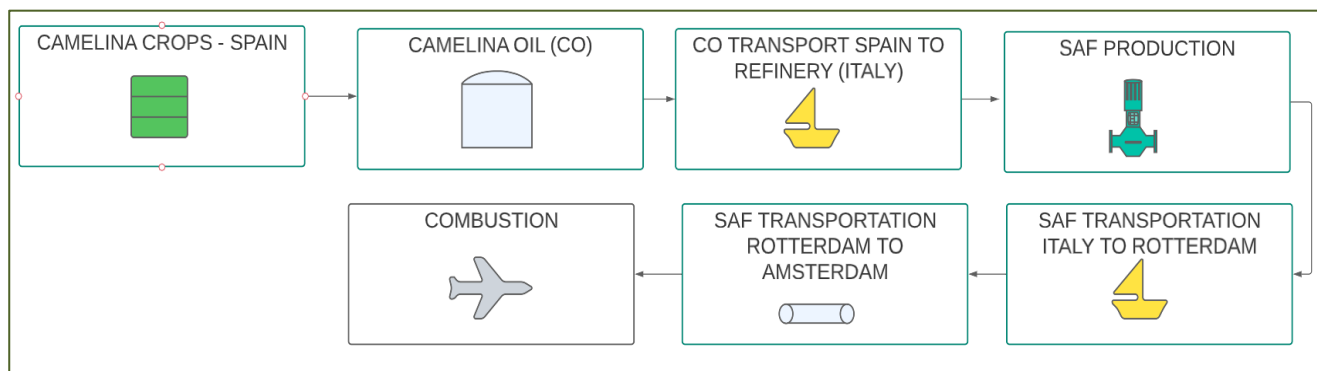


Figure 10. Bio4A value chain (Feedstock: CO)

It is important to mention that the feedstock used for the SAF production are Camelina, a non-food energy crop, and Used Cooking Oil, waste vegetable oil. This ensures the Local Food Security.

4 Social assessment

4.1 Goal and Scope

4.1.1 Definition of goal and scope

The first step of an SLCA aims to specify why the study is being conducted. The goal(s) should be clearly defined in order to ensure successful outcomes. The main goal of this deliverable is to study the social potential impacts of the Bio4A project, by conducting the sustainability assessment of the overall value chain. This evaluation is based on the Bio4A partners' own experience in each of the stages of the value chain. The main references recognized in Europe will be taken into account and a selection of criteria applicable to the processes under study will be made for a more detailed evaluation.

Specific objectives

- To identify the social impacts associated with each of the stages of the BIO4A value chain.
- To estimate their scope in terms of the stakeholder affected.

4.1.2 Functional unit

Corresponding to UNEP/SETAC guideline, it is necessary to define the Functional Unit (FU) in the goal and scope phase of the study, as this contributes the necessary basis for the product system modeling.

However, given that the main axis for carrying out the SLCA is based on the ELCA, it is important to differentiate between semi-quantitative and qualitative data and indicators, so that the impacts

should not express the relationship with the FU (Manik, Leahy, Cycle, et al., 2013; Nemarumane & Mbohwa, 2013; Petti et al., 2018; Zamagni et al., 2011). For the reasons explained above, a FU is not defined for this analysis.

4.1.3 Selection of Stakeholders and subcategories

In an SLCA, the impacts are classified into different categories involving stakeholders (**workers, the local community, value chain actors, consumers and society**), which are affected by the activities of the organisations involved in the life cycle of the product or service. These categories are the basis of the SLCA. For this reason, it is important to justify the inclusion or exclusion of the categories in the scope of the application.

This study will analyze all stakeholders except consumers, since the analysis of the project's impact on them would be very complex. In addition, none of the certifications analyzed in the comparison includes them, only the UNEP and PSIA methodologies.

Subcategories

Linked to the stakeholder categories, are the impact subcategories that compromise socially significant themes or attributes. These subcategories are assessed by the use of impact indicators, of which inventory indicators link directly with the inventory of the product life cycle. Several indicators may be used to assess each of the subcategories.

The subcategories are socially significant themes or attributes which include human rights, work conditions, cultural heritage, poverty, disease, and political conflict. Subcategories are classified according to stakeholder and impact categories and are assessed by the use of inventory indicators. In this case, as mentioned above, the stakeholders selected for the analysis and each of its subcategories are: workers, local community, value chain actors and society.

In order to select the subcategories to be studied, the comparison of the different methodologies and certifications label has been taken into account. Thus, in this analysis, those that are most preeminent and therefore have more weight will be evaluated. Figure 11 shows the subcategories analyzed in the *RSB (CORSA)*, *ISCC (CORSA)* and *RSPO* certifications, classified according to the UNEP guidelines.

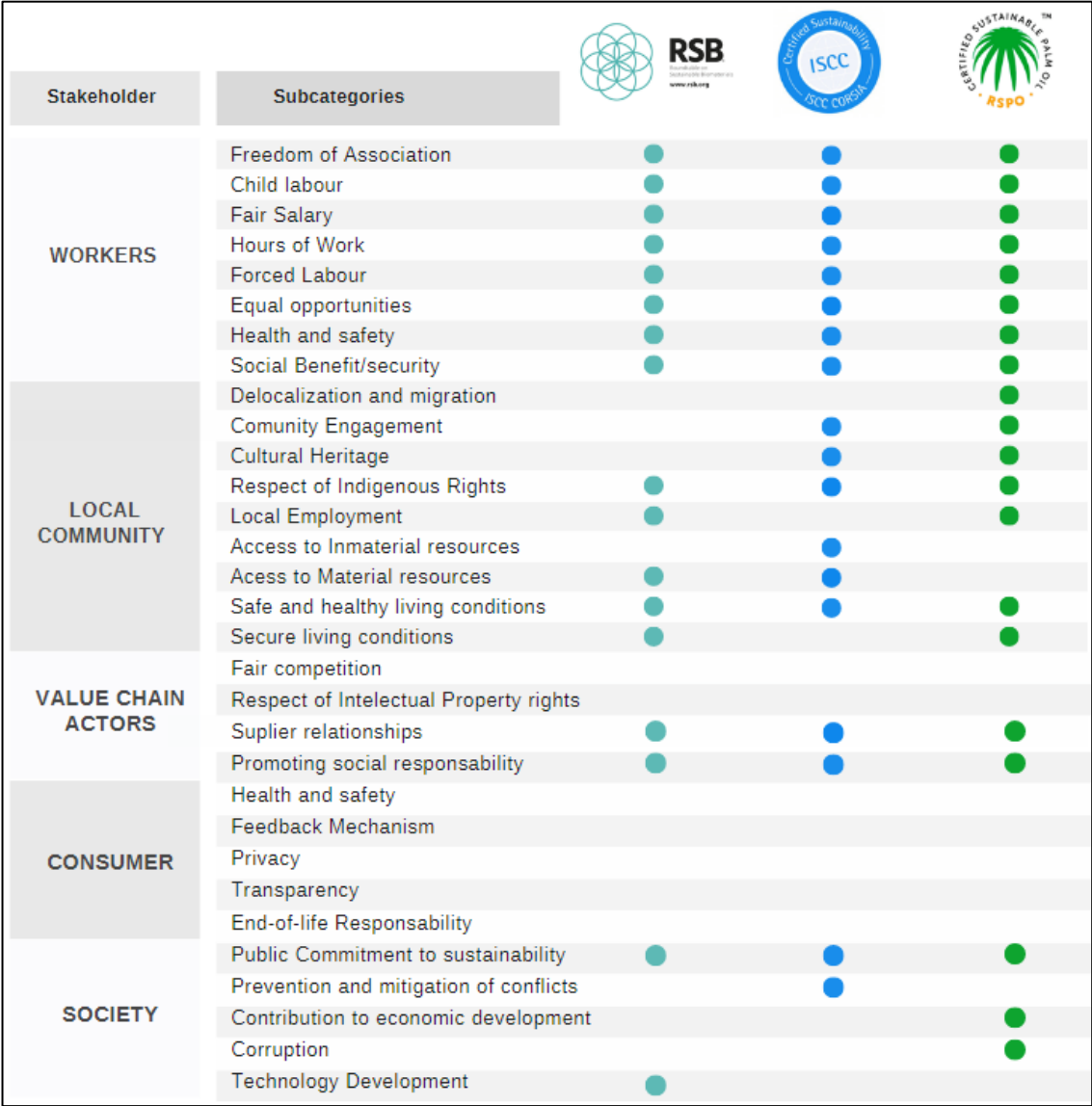


Figure 11. Comparison of certification programmes

As can be seen, all certifications labels have an exhaustive analysis of the impact on workers, so they will also have an important weight in this assessment. Table 1 shows the subcategories selected for workers involved in all the value chain. Those that are most relevant and easier to measure by simple indicators have been selected, because all companies keep an exhaustive record of salaries, contracts, hours of work, accidents, etc.

Table 1. Subcategories analyzed for workers.

Stakeholder	Subcategory	Description
Workers	Health and safety	Assess the incidents and the status of prevention and management practices
	Fair wages	Evaluate whether practices related to employee wages are in compliance with regulations and whether the wage offered complies with legal requirements, and whether it can be considered a living wage.
	Forced labour	Practices such as the use of compulsory prison labour by private commercial entities, debt bondage and human trafficking are discussed.

	Equal opportunities /discrimination	The company's equal opportunity management practices and the presence of discrimination in the opportunities that organizations offer to workers and in working conditions are evaluated.
	Freedom of association and collective bargaining	The freedom of workers to form and join organizations of their own choosing, to promote and defend their interests, and to bargain collectively with other parties is assessed.
	Reconciliation of work and family life	The number of hours actually worked is checked to ensure that it complies with ILO standards and, when overtime occurs, it is compensated in cash or time off.

Table 2, shows the subcategories to be studied for the people living in the area of each of the processes involved in the study.

Table 2. Subcategories analyzed for Local community.

Stakeholder	Subcategory	Description
Local community	Health and safety	Assesses the general safety conditions of the organizations' operations and their impact on public health .
	Access to tangible resources	Evaluates the extent to which organizations respect, provide or improve community access to local material resources and infrastructure (i.e. water, land, roads, health facilities, schools, etc.).
	Community engagement	The company's engagement with community stakeholders is measured, to continually foster greater trust and relationship with the local community .
	Employment	The extent to which the company or facility creates new jobs in a manner which contributes to the economic development of the community.

Finally, table 3 shows the subcategories of value chain actors and society to be studied.

Table 3. Subcategories analyzed for Value chain actors and Society.

Stakeholder	Subcategory	Description
Value chain actors	Land rights	Assess small-scale entrepreneur's legal rights and tenure security .
	Fair trading relationships	Analyze the quality of the business relationship between small entrepreneurs and value chain actors.
	Supplier relationship	Follow up on the procurement of raw materials from the company and its suppliers.
	Conflict zones	Knowing whether or not suppliers are in conflict zones
	Child labour	Ensure that all work is appropriate to the subject's age and physical condition .
Society	Compliance with the SDGs	Assess the compliance with de SDG's by the project.

Sustainable developments goals

In 2015, the United Nations promoted the introduction of seventeen Sustainable Development Goals (SDGs), aimed at shaping the sustainable development agenda for a more prosperous, inclusive and sustainable society by 2030. The SDGs are organized in a framework of global indicators, developed by the Inter-Institutional and Expert Group on SDG Indicators. According to this framework, each of the SDGs includes a list of goals, the progress of which is measured by indicators, with a total of 230 indicators (United Nations, 2021). Aviation is a crucial driver of

economic and social growth and plays an essential role in supporting the UN SDGs through generating connectivity between nations. The aviation sector develops millions of jobs, enables tourism and supports sustainable progress worldwide. The following highlights the role of aviation for the majority of the SDGs.

Meeting the SDG targets is leading governments and industry to integrate sustainability issues into their own decision-making process. That is why the social role of sustainability is currently playing a very important role in all types of analysis and research; it is an aspect that is increasingly included in the current literature. In this way there are studies that analyses the life cycle impact of products and services on SDG's (Herrera Almanza & Corona, 2020). In Table 4, each subcategory is linked to the SDGs in which it creates a possible social impact (either positive or negative) for each of the stakeholders analyzed.

Table 4 SDG's related to each of the chosen subcategories

Workers		Local community		Value chain actors	
Subcategories	SDG´s	Subcategories	SDG´s	Subcategories	SDG´s
Health and safety	2,3,6,8	Safe and healthy	3,6	Land rights	1,2,5,11
Fair Salary	1,2,3,4	Access to tangible resources	9,12	Fair trading relationships	8,10
Forced labour	3,8,10	Community engagement	11,12	Supplier Relationship	1,8
Equal opportunities	1,4,5,8,10	Employment	8	Access to material resource	1,8
Freedom of association	8,10,16			Child labour	8,16
Reconciliation of work	3,8				

4.1.4 System boundaries

The system boundaries determine the parts of the product system that will be included in the system being assessed. In determining these limits, the precision that can be obtained from the available data must be taken into account. This assessment considered the value chain of the SAF by UCO/animal fat (tallow cat.1 and 2)/CO, employing a **cradle to gate** approach (figure 12). So the life cycle stages included in the analysis are the obtaining of the raw material (UCO/animal fat (tallow cat.1 and 2) / CO), its transport to the biorefinery (Italy), the production of the biojet and its transport to the Schiphol airport (Amsterdam).

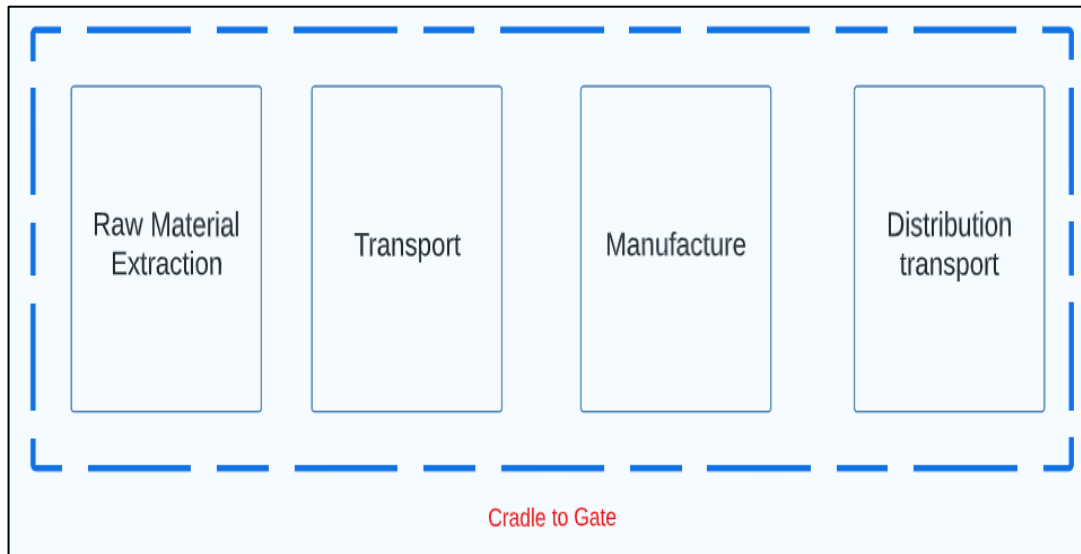


Figure 11. System boundaries

Excluded stages from the analysis.

The social impacts related to the manufacture of the machinery and the infrastructures used in the process have been excluded from the analysis.

4.1.5 Data quality requirements

To carry out the social impact analysis, a series of indicators and their respective evaluation system were structured based on the methodologies and certification seals analysed in section 2.1.

The following sections are contemplated for the collection of information:

- **Geographical coverage:** The data obtained represent the regions where the value chain members interact.
- **Exhaustiveness:** The relevant processes of the value chain are analysed.
- **Reliability:** The primary data have been collected through a technological platform, facilitating their interpretation.

4.2 Life cycle Inventory (LCI)

During the Life Cycle Inventory, we need to collect data for the social flows which link with the socio-economic system through the activity variable. For each of the impact and subcategories selected in accordance with the Goal and Scope section, it is necessary to identify corresponding inventory indicators. These indicators should be compatible with the selected approach of impact assessment and be related to the main stakeholders and subcategories (UNEP/SETAC 2020).

Site-specific inventory data has been obtained through specific stakeholder questionnaires (Annex I), through direct communication with the Bio4A Consortium technology partners (reviewing technical and corporate reports), and through web research. A key point of this analysis is the use of structured interviews according to the selected indicators, with the stakeholders who suffered both the social opportunities and the threats related to the production of SAF through the Bio4A process.

4.3 Methodology Assessment

During the inventory phase, reference scales have been established for each of the indicators used. It is a crucial preparatory step for organizing inventory data collection and for the implementation of the impact assessment. In this case, each used-related hotspot receives a score between -2 and +2 through assessment with performance indicators and reference scales.

Table 5. Generic ascending reference scale, for social performance evaluation (Indrane et al., 2018)

Scale level	Description	Risk level
+2	Ideal performance	Very Low Risk
+1	Progress beyond compliance	Low risk
0	Compliance with local laws	Medium risk
-1	Non-compliant situation, improving	High risk
-2	No data or Non-compliant situation	Very high risk

5 Results

Sustainability is a relevant topic focusing on economic, environmental and social impacts. At the organizational level, more priority has been given to the economic part, with environmental aspects coming second. Still, the social element needs to be developed, and evidence of the scarcity of methodologies developed to assess this aspect.

Analysing social impacts within the value chain is important in strengthening sustainability analyses. It allows us to analyse social environments where improvement points can be identified.

To carry out the Bio4A project, a Bio4A methodology has been developed as the result of the analysis of different methodologies and certification seals.

To understand the different risks associated with the options selected by the companies, it is important to refer to table 5 and see the description of each one.

Given the potential that the CO has for the SAF production, firstly, the answers analysed for this supply chain will be shown (5.1), and then the answers analysed for the UCO (5.2).

5.1 Camelina Oil

Workers

To carry out the social impact analysis, the first group of stakeholders analysed corresponds to the workers, for which six indicators have been examined, as shown in figure 12.

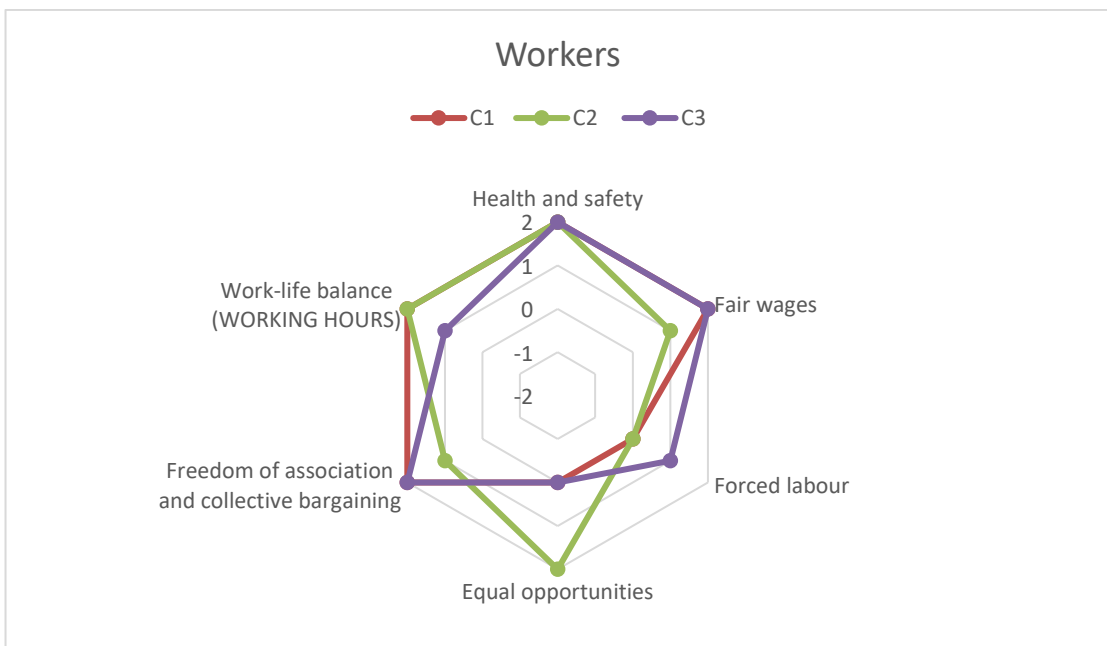


Figure 12. Workers indicators (CO)

Health and safety

For the first indicator, according to the reference scale, all partners (Company 1, 2 and 3) obtained the highest score (+2), placing them at very low risk.

The answer that allowed the three partners to have a very low risk was:

- The company and its facilities have an established and documented process (PDCA - Plan-Do-Check-Act) to proactively protect the health and safety of workers, including education and training, incident records, and designated occupational health and safety personnel. In addition, the company's commitments to these issues are publicly known.

Fair wages

In this case, two partners obtained a score of +2 (C1 and C3), placing them on the scale of very low risk, while company 2 obtained +1 (low risk).

The response that has allowed the three partners to have a very low risk was:

The entire workforce receives a living wage and social benefits in addition to those provided by the government, such as:

- Retirement: There is a system in place that can provide a living wage if the worker works at least 40% of the time after the locally agreed retirement; if the government does not give it, the company offers to provide or supplement the services offered by the state.
- Health insurance: The Company must supplement or provide coverage to cover treatment for serious and potentially disabling illnesses.
- Disability: The Company must offer insurance to provide a minimum income in case of disability until retirement.

Whereas the response that has identified a low risk to company 2 is:

- The entire workforce receives a living wage and social benefits provided by the government.

Forced labour

The third indicator analysed is that of Forced Labour, in this case one of the partners (Company 3) was placed at low risk, and the other two partners obtained at medium risk (Company 1 and company 2).

The answer that has placed company 3 at low risk is

- The company/facility has a PDCA process to raise awareness of forced labour issues.

Finally, the answer that has placed the partners at medium risk is:

- The company or facility has a system in place to enforce the policy prohibiting the withholding of all or part of a worker's wages, benefits, property or original documents, and there is evidence that forced labour does not exist.

Equal opportunities

The results shown two partners at medium risk, and the answer that has placed partners at medium risk is:

The company or establishment has a system to enforce the non-discrimination policy. Examples of evidence:

- Pay slips or wage records of workers confirm equal pay for work of equal value.
- Anonymous job application procedures.
- Complaint mechanisms are in place for workers to communicate a complaint or raise a grievance about any action that violates the non-discrimination policy.

Finally, the answer that has placed the partners at very low risk is:

- The senior management of the company or site has publicly acknowledged that non-discrimination is a key priority. A PDCA process is in place to promote non-discrimination. Programme commitments, performance, progress and effectiveness are publicly communicated.

Freedom of association and collective bargaining

The fifth indicator analysed places company 3 at very low risk, while company 1 and 2 at low risk.

The answer that has placed C1 and C3 at very low risk is:

- The company engages in dialogue with workers' collective representation and incorporates their views into management decisions

The answer that has placed C2 at low risk is:

- The company or establishment recognises the collective representation of organised workers in negotiations.

Work-life balance (WORKING HOURS)

For the last indicator analysed in this category, one of the partners (company 1 and 2) scored +2, placing it at very low risk. The partners selected the following option:

The company or facility has a PDCA process to promote work-life balance.

Type of data sources:

- Management commitment: Percentage of employees benefiting from flexible working arrangements/management of employee workload/special remuneration/time off for overtime.
- Resources: Training/coaching. Sports/facilities (etc.)
- Results: Unemployment.

While the score for the remaining was +1, resulting in low risk, with the following option:

The company or establishment has a system to enforce the flexible working time/hours/parental leave policy.

- Example of evidence: Records show that workers with direct family responsibilities can benefit from maternity protection and take maternity, paternity or compassionate leave when necessary.

LOCAL COMMUNITY

It is important to mention that C1 has no relationship with the local communities in its business, but if it did, it would comply with local requirements and laws, so a score of 0 (Compliance with local laws) has been assigned to all the items in this section.

The next analysis was done for the local community, in this case four indicators were analysed as shown in figure 13.



Figure 13. Local Community indicators (CO)

Health and safety

The result of this indicator analysed is that the partners (company 2 and company 3) have a rating of +1, placing them at a low risk. To obtain this rating, they have selected the following option:

The company or facility has a PDCA programme to address the health and safety of local communities beyond the requirements set out in local legislation. The programme includes (but is not limited to):

- A strategy to prevent and mitigate adverse impacts on local communities.
- Regular monitoring and analysis of data.
- Proactive actions to improve the health and safety of the community, e.g. through education and awareness raising, improved technology, pollution control, etc.

On the other hand, partners (company 1) have placed themselves in a medium risk with a rating of 0. In this case, the selected option was:

- The company or facility has a local community health and safety policy to meet requirements set by local laws or international standards

Access to tangible resources

Analysing the indicator of access to tangible resources has resulted in two partners (company 2 and company 3) obtaining a +1 rating, which determines a low risk. In contrast, company 1 was placed in a medium risk.

The answer that has placed partner company 2 and company 3 at very low risk is:

The company or facility has a system or mechanism to enforce local community access policy to tangible resources by local legislation. Examples:

- Regular monitoring of risks and adverse impacts on community health and safety.
- Implementation of measures required by local legislation to avoid adverse impacts.

While, the answer that has placed partner Company 1 at medium risk is

- No incidents of the actual damage, adverse impacts or risks to community access to tangible resources have been discovered. However, the company or facility has a policy to ensure local community access to tangible resources under local laws and regulations

Community engagement

Concerning Community engagement, two partners (C1 and C3) were classified as medium risk, choosing the following option:

The company or facility has a system or mechanism in place to enforce the policy for dealing with enquiries and complaints from the local community.

Examples of evidence

- Establishment of formal communication channels between the company or facility and the community.
- Establish guidelines and timelines on how to address community consultations and complaints transparently and systematically.
- Implementation of measures required by local legislation to avoid adverse impacts.

While, the answer that has placed partner Company 1 at medium risk is:

- The company or facility engages in dialogue with community representatives and incorporates their views into management decisions.

Employment

For the last indicator that was analysed, only one partner (company 3) scored +2, one of them (company 2) scored +1, and the last one (company 1) scored zero, which places it on a medium risk scale. The selected options are shown below, in the same order in which they were ranked.

- Policies and commitments are published, and a grievance mechanism is in place to address complaints about the selection of staff and the management of commitments.
- The company has publicly committed to increasing local employment or at least keeping the workforce stable in the long term.
- The company has a policy of creating shared value with small regional subcontractors, small owners or small entrepreneurs, including an agreed policy and commitment on:
 - ✓ Fair working conditions for workers.
 - ✓ Fair wages for workers, at least at the level of the minimum wage.
 - ✓ Non-discrimination.

VALUE CHAIN ACTORS

The next analysis was done for value chain actors, in this case five indicators were analysed as shown in figure 14.

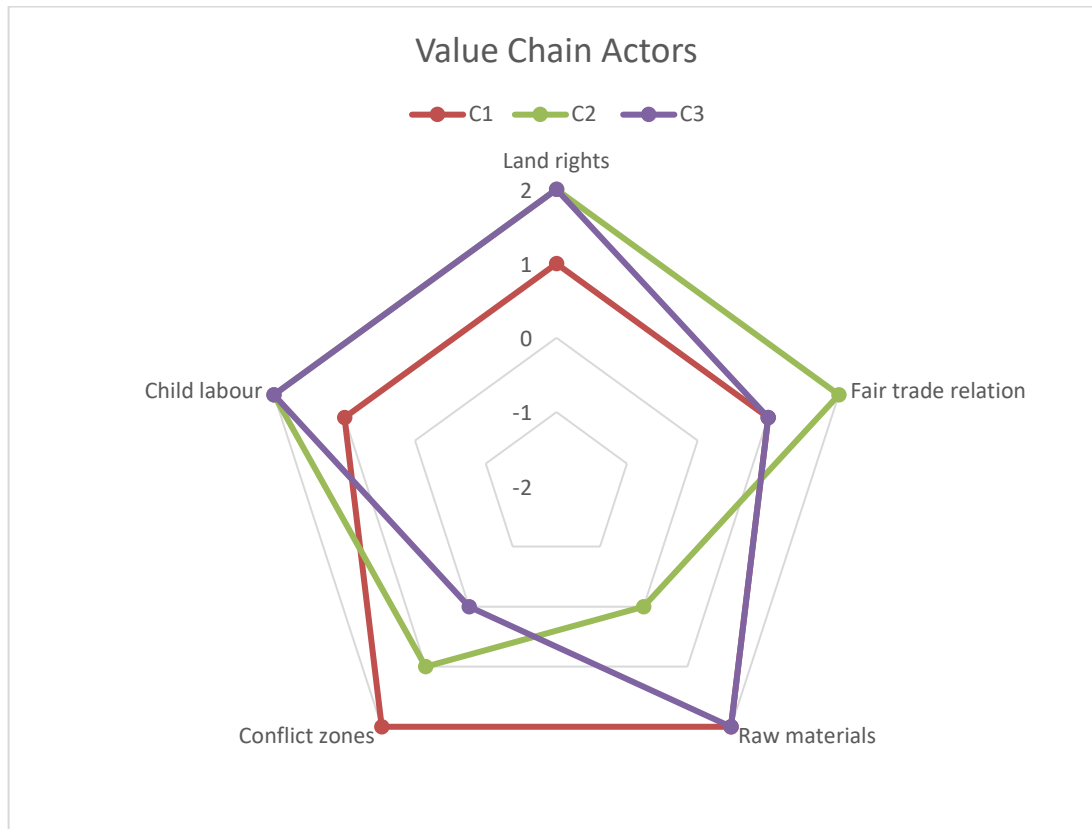


Figure 14. Value chain actors indicators (CO)

Land rights

For the first indicator that was analysed in value chain actors, two partner (company 2 and 3) scored +2, and one of them (company 1) scored +1. The selected options are shown below, in the same order in which they were ranked

- Entrepreneurs consider land rights to be secure.
- Security risks are frequently assessed on land tenure.

Fair trade relations

The result of this indicator analysed is that the partners (company 1 and company 3) have a rating of +1, placing them at a low risk. To obtain this rating, they have selected the following option:

- Actions are carried out to encourage small entrepreneurs to join collectives, cooperatives and associations/groups

On the other hand, one partner (company 2) have placed themselves in a very low risk with a rating of +2. In this case, the selected option was:

- Small entrepreneurs can get bonuses.

Raw materials

According to the reference scale, two of the partners (Company 1 and Company 3) obtained the highest score (+2), placing them at very low risk, while only one (Company 2) got a score of 0, which puts it at medium risk.

The answer that allowed to the partners to have a very low risk was:

- The company has transparent knowledge of its suppliers' raw material purchases

Whereas the response that has identified a medium risk to company 2 is:

- The company is concerned about how suppliers procure raw materials.

Conflict zones ⁴

Analysing the indicator of conflict zones, the results shown one partners (company 1) in a very low risk, company 2 in low risk, and company 3 in medium risk.

The answer that has placed company 3 at medium risk is:

- One could say that the company has its suppliers divided into developed and developing countries.

Answer that has placed company 2 in a low risk is:

- Most suppliers are located in developed countries.

While, the answer that has placed partner Company 1 at very low risk is

- All suppliers are located in developed countries

Child labour

The result of this indicator analysed is that company 1 have a rating of +1, placing in a low risk. To obtain this rating, they have selected the following option:

- It is known first-hand that there is no child labour, given the constant monitoring carried out by the company.

On the other hand, partnern (company 2 and company 3) have placed themselves in a very low risk with a rating of +2. In this case, the selected option was:

- It is known first-hand that there is no child labour, given the constant monitoring carried out by the company.

⁴ For more information see annex II
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5.2 Used Cooking Oil

In the case of used cooking oil, only two partners interact, C1 and C3.

The general results for the categories analysed as workers, local community and value chain actors are shown below.

Workers

For the first category analysed (figure 15), in three of the indicators, the two partners have the same score. On the one hand, two indicators place them at very low risk (health and safety and fair wages), and on the other hand, one indicator places them at medium risk (equal opportunities).

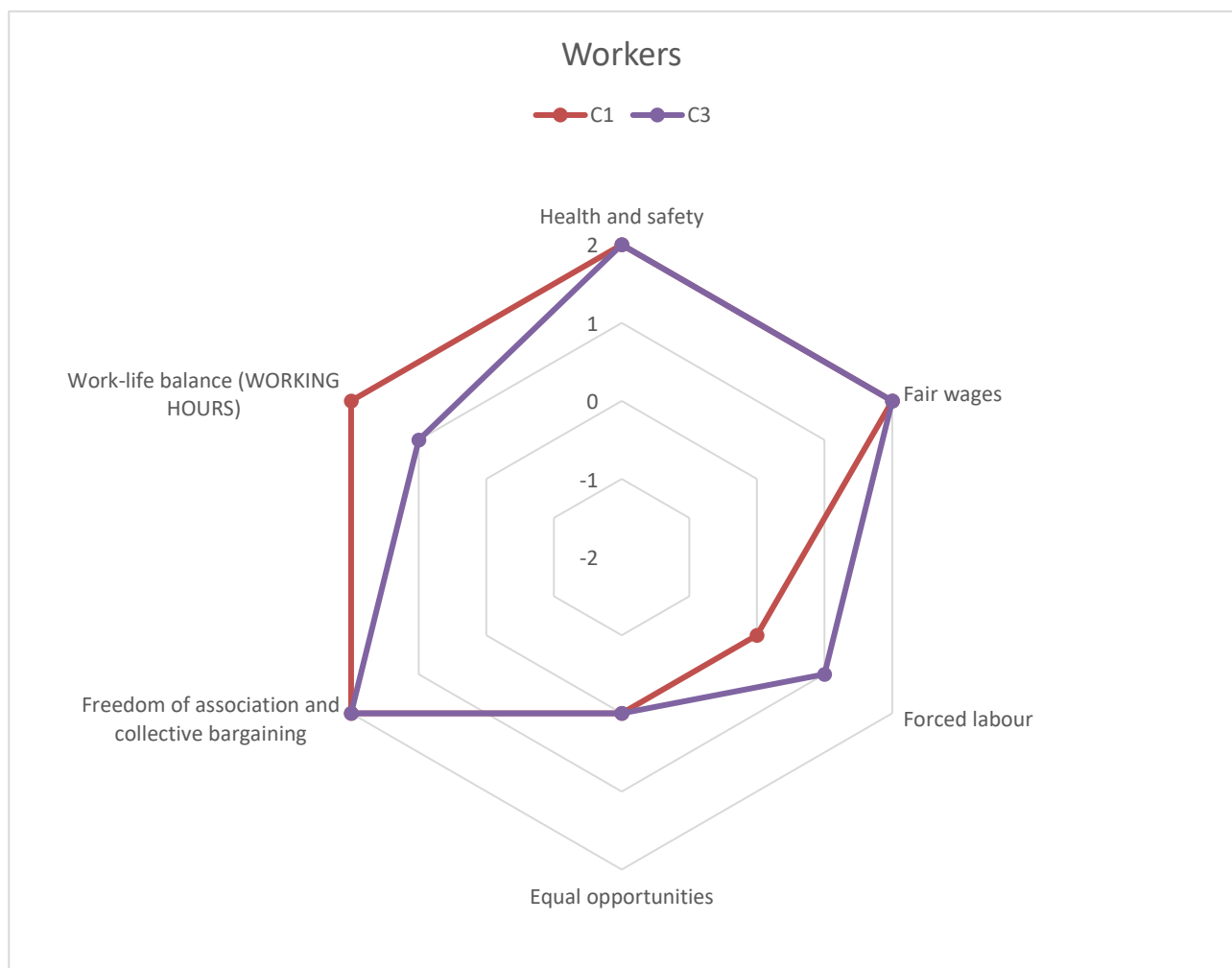


Figure 15. Workers indicators (UCO)

Local Community⁵

In the second category (Figure 16), which refers to the local community, they only agree on one indicator (community engagement) that places them at medium risk.



Figure 16. Local community (UCO)

Finally, for the last (figure 17), they coincide again in only one indicator that places them with a very low risk.

⁵ See comment pg 23

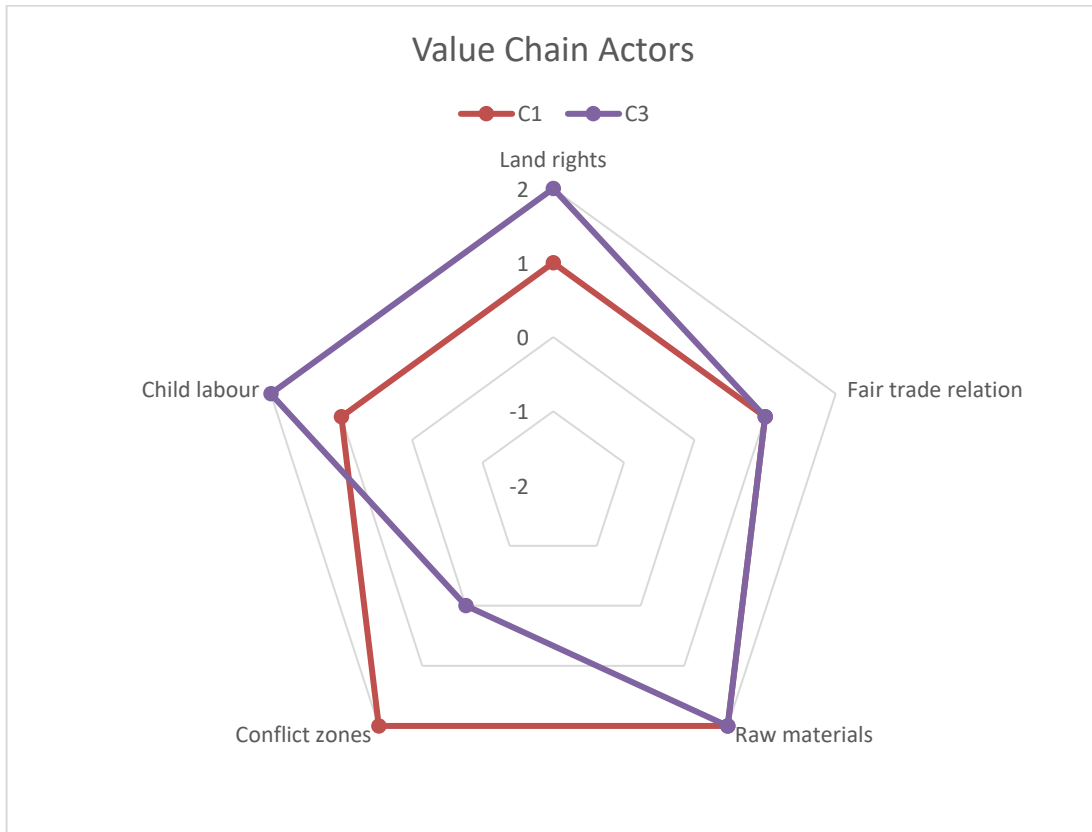


Figure 17. Value chain indicators (UCO)

5.3 Animal fats

In the case of animal fats, only two partners interact, C1 and C3.

The general results for the categories analysed as workers, local community and value chain actors are similar to the Used Cooking Oil. The results are shown below.

Workers

For the first category analysed (figure 18), in three of the indicators, the two partners have the same score. On the one hand, two indicators place them at very low risk (health and safety and fair wages), and on the other hand, one indicator places them at medium risk (equal opportunities).

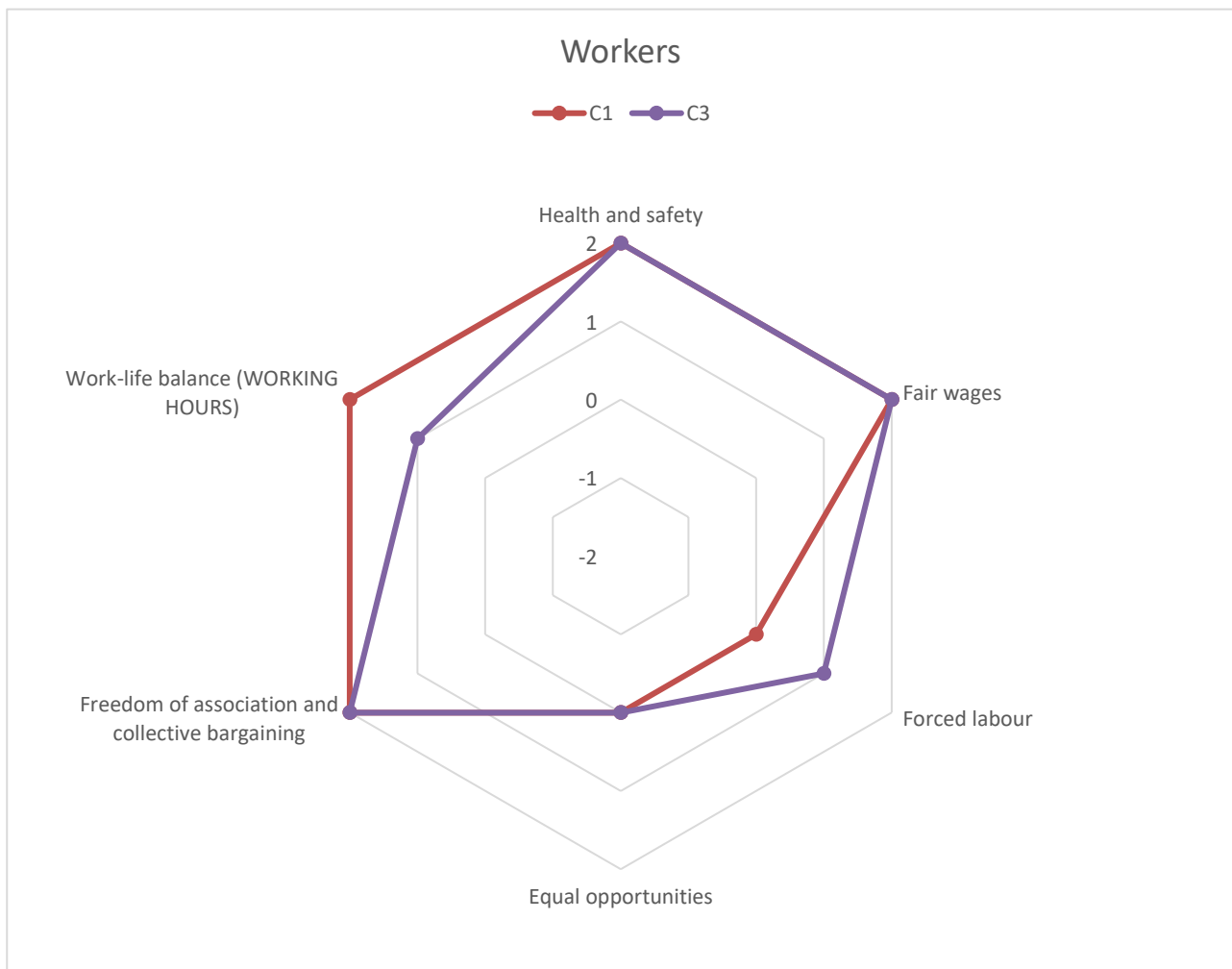


Figure 18. Workers indicators (Animal fats)

Local Community⁶

In the second category (Figure 19), which refers to the local community, they only agree on one indicator (community engagement) that places them at medium risk.



Figure 19. Local community (Animal Fats)

Finally, for the last (figure 20), they coincide again in only one indicator that places them with a very low risk.

⁶ See comment pg 23

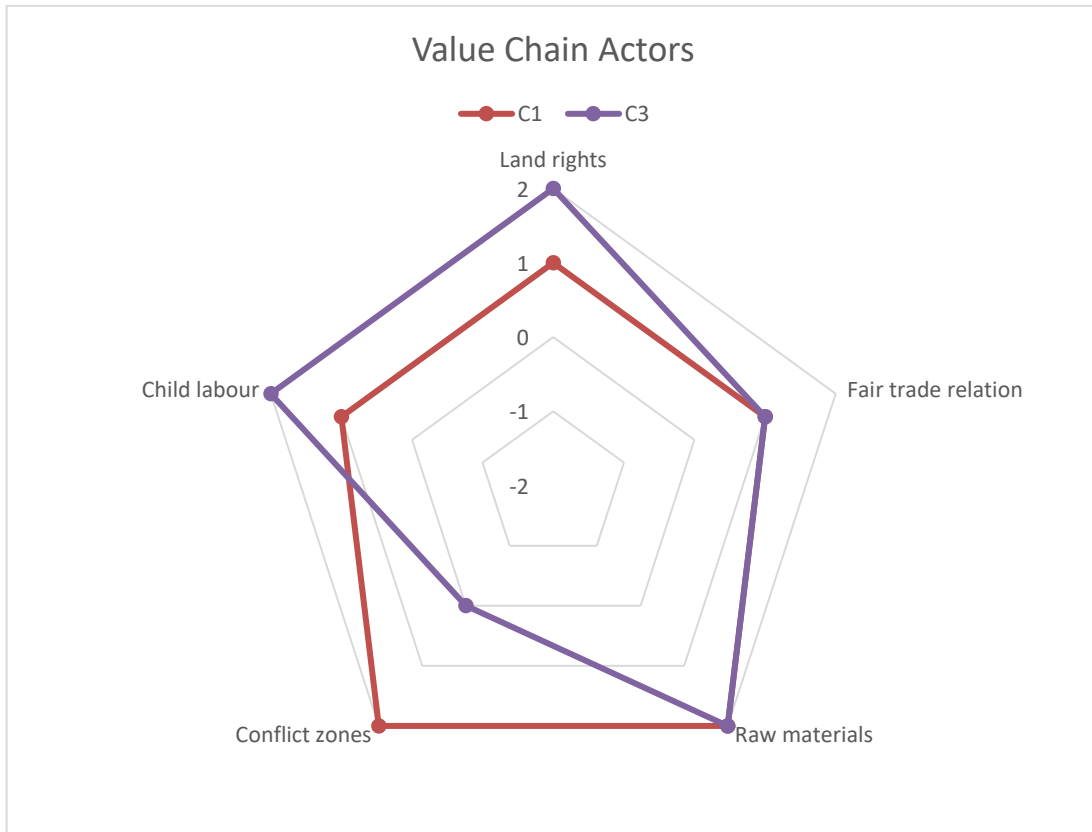


Figure 20. Value chain indicators (Animal Fats)

6 Conclusions

While the social impact is of utmost importance for value chains, as it allows for identifying sources of improvement through value chains, the reality is that there needs to be more tools and methodologies to carry out this analysis. Furthermore, it is important to differentiate that although there are extensive methodologies for carrying out environmental impact analyses, the same is not valid for social impacts.

To carry out this study, it was necessary to structure and generate a customised methodology in which the use of the functional unit has been discarded, given that the type of analysis carried out has a structure in terms of qualitative and semi-quantitative indicators. Having explained the above, this methodology allows us to focus on and evaluate the behaviour of organisations and their value chain, not only for the biofuels industry but it can be used for any industry.

On the other hand, it is important to highlight that to carry out this type of study within organisations, transparency is needed when it comes to knowing their social impact, and this is due to the sensitive issues that may be encountered, such as child labour by a supplier. For this reason, companies must know their value chain structure very well.

Finally, in the context of Bio4A, it was possible to learn about the partners' positive and negative social impacts and their value chains. Knowing these impacts is a relevant issue because it allows us to know which aspects the organisation and its chains are doing well and which factors could be improved. In general terms, within the analysis carried out for Bio4A, only one of the partners was identified as having three indicators categorised as high and very high risks, i.e. negative social impacts, which allows the organisation, after knowing its results, to take actions to attack these types of situations at their roots.

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Annex I – Survey

Workers

Health and safety

The company and its facilities have an established and documented process (PDCA – Plan-Do-Check-Act) to proactively protect the health and safety of workers, including: education and training, incident records, designated occupational health and safety personnel. In addition, the company's commitments on these issues are publicly known.

The company and its facilities have an established PDCA process to proactively protect the health and safety of workers.

The company does not have a PDCA process, but continuously monitors the occupational health and safety of workers.

The company does not have a PDCA process, but a corrective action plan has been developed with a clear timetable for its implementation.

The company has no available data related to occupational health and safety issues.

Fair wages

The entire workforce receives a living wage and social benefits in addition to those provided by the government, such as:

- Retirement: There is a system in place that can provide a living wage if the worker works at least 40% of the time after locally agreed retirement; if the government does not provide it, the company offers to provide or supplement the services offered by the state.
- Health insurance: The company must supplement or provide health insurance coverage to cover treatment for serious and potentially disabling illnesses.
- Disability: The employer must offer insurance to provide a minimum income in case of disability, until retirement.

The entire workforce receives a living wage and social benefits provided by the government.

The entire workforce is paid a wage that meets minimum legal or industry standards.

All staff receive a salary that meets minimum legal or industry standards, however, there have been delays in making payments.

Not all staff are paid a wage that meets minimum legal or industry standards.

Forced labour

The company or facility has a PDCA process for publicising forced labour issues. Programme commitments, performance, progress and effectiveness are publicly communicated.

The company or facility has a PDCA process in place to raise awareness of the problems associated with forced labour.

The company or facility has a system in place to enforce the policy prohibiting the withholding of all or part of the worker's wages, benefits, property or original documents and there is evidence that no forced labour is involved.

Incidents of forced labour have been discovered in the company or facility and a corrective action plan has been developed with a clear timetable for completion.

Incidents of forced labour have been discovered in the company or facility, but no corrective action plan with a clear timetable for completion has been developed.

Equal opportunities

The senior management of the company or site has publicly acknowledged that non-discrimination is a key priority. A PDCA process is in place to promote non-discrimination. Programme commitments, performance, progress and effectiveness are publicly communicated.

The company or facility has a PDCA process to proactively promote non-discrimination.

The company or establishment has a system in place to enforce the non-discrimination policy. Examples of evidence:

- Pay slips or wage records of workers confirm equal pay for work of equal value.
- Anonymous job application procedures.
- Complaint mechanisms in place for workers to communicate a complaint or raise a grievance about any action that violates the non-discrimination policy.

If incidents of discrimination have been discovered, the company or facility has established a corrective action plan with a clear timetable for completion.

Incidents of discrimination have been discovered in the company, but a corrective action plan with a clear timetable for its implementation has not been developed.

Freedom of association and collective bargaining

The company engages in dialogue with workers' collective representation and incorporates their views into management decisions.

The company or establishment recognises the collective representation of organised workers in negotiations.

The company has a system for enforcing policy that allows for freedom of association and bargaining.

Incidents have been uncovered which demonstrate that the company is impeding workers' rights to freedom of association and collective bargaining, but a corrective action plan has been drawn up with a clear timetable for completion.

Incidents have been uncovered that demonstrate that the company is impeding workers' rights to freedom of association and collective bargaining, but no corrective action plan with a clear timetable for implementation has been developed.

Reconciliation of work and family life

The company or facility has a PDCA process to promote work-life balance.

Type of data sources:

- Management commitment: Percentage of employees benefiting from flexible working arrangements/management of employee workload/special remuneration/time off for overtime worked.
- Resources: Training/coaching. Sports/facilities (etc.)
- Results: Unemployment.

The company or establishment has a system in place to enforce the flexible working time/working hours/parental leave policy.

- Example of evidence: Records show that workers with direct family responsibilities can benefit from maternity protection and take maternity, paternity or compassionate leave when necessary.

Hours worked in a normal working week, not including overtime, are below the limits set by law or international standards.

The company or establishment has a policy on flexible working arrangements/working hours/parental leave and does not have a system to enforce the policy.

Hours worked in a normal working week, not including overtime, exceed 48 hours.

Local community

Health and safety

The company or facility reports and publicly discloses its commitments, performance, progress and effectiveness of PDCA programmes/initiatives/activities.

The company or facility has a PDCA programme to address the health and safety of local communities beyond the requirements set out in local legislation. The programme includes (but is not limited to):

- A strategy to prevent and mitigate adverse impacts on local communities.
- Regular monitoring and analysis of data.
- Proactive actions to improve the health and safety of the community, e.g. through education and awareness raising, improved technology, pollution control, etc.

The company or facility has a local community health and safety policy to meet requirements set by local laws or international standards.

If incidents of actual harm, adverse impacts or risks to community health and safety have been discovered, the company or facility has developed a corrective action plan with an implementation schedule.

If incidents of actual harm, adverse impacts or risks to community health and safety have been discovered, the company or facility has not developed a corrective action plan with a timeline for implementation.

Access to tangible resources

The company or facility reports and publicly discloses its commitments, performance, progress and effectiveness of programmes/initiatives/activities on access to tangible resources, as it accounts for the PDCA.

The company or facility has a system or mechanism in place to enforce local community access policy to tangible resources in accordance with local legislation. Examples:

Regular monitoring of risks and adverse impacts on community health and safety.

Implementation of measures required by local legislation to avoid adverse impacts.

No incidents of actual damage, adverse impacts or risks to community access to tangible resources have been discovered. However, the company or facility has a policy to ensure local community access to tangible resources in accordance with local laws and regulations.

If incidents have been discovered, the company or facility has developed a corrective action plan with a clear timetable for completion.

If incidents have been discovered, the company or facility has not developed a corrective action plan with a clear timeline for completion.

Community engagement

The company has implemented rules that require it to base its decisions on the consent of the local community if those decisions have serious implications for the community.

The company or facility engages in dialogue with community representatives and incorporates their views into management decisions.

The company or facility has a system or mechanism in place to enforce the policy for dealing with enquiries and complaints from the local community.

Examples of evidence

- Establishment of formal communication channels between the company or facility and the community.
- Establishment of guidelines and timelines on how to address community consultations and complaints in a transparent and systematic manner.
- Implementation of measures required by local legislation to avoid adverse impacts.

The company or facility has a policy to address local community enquiries and complaints, but does not have a system or mechanisms in place to enforce it.

If incidents have been discovered, the company or facility has failed to address community queries and complaints.

Employment

Policies and commitments are published, and a grievance mechanism is in place to address complaints about the selection of staff and the management of commitments.

The company has publicly committed to increasing local employment or at least keeping the workforce stable in the long term.

The company has a policy of creating shared value with small regional subcontractors, small owners or small entrepreneurs, including an agreed policy and commitment on:

- Fair working conditions for workers.
- Fair wages for workers, at least at the level of the minimum wage.
- Non-discrimination.

The company does not undertake any capacity building and works with local suppliers and smallholders solely on the basis of lowest price and speed of delivery.

The company exerts pressure on price and other conditions when subcontracting to local entities

Value chain actors

Land rights

Entrepreneurs consider land rights to be secure.

Security risks are frequently assessed on land tenure.

Most small entrepreneurs have documented legal rights to the land.

Most small entrepreneurs believe that their land rights are not secure.

The security of land rights is neither monitored nor known.

Fair trade relations

Small entrepreneurs can get bonuses

Actions are carried out to encourage small entrepreneurs to join collectives, cooperatives and associations/groups.

Most small entrepreneurs are aware of the quality standards, pricing structure and premium requirements.

Only a small proportion of small entrepreneurs are aware of quality standards, pricing structure and premium requirements.

No assessment has been carried out to understand small entrepreneurs' perception and knowledge of the pricing structure and quality standards.

Raw materials

The company has transparent knowledge of its suppliers' raw material purchases.

The company is aware of the procurement of raw materials by its suppliers.

The company is concerned about how suppliers procure raw materials.

The company does not know how its suppliers access raw materials, but it has a time-bound action plan in place.

The company does not know how its suppliers are accessing raw materials, but neither has the company established a time-bound action plan for compliance.

Conflict zones

All suppliers are located in developed countries.

Most suppliers are located in developed countries.

One could say that the company has its suppliers divided into developed and developing countries.

Most suppliers are located in developing countries.

All suppliers are located in developing countries.

Child labour

It is known first-hand that there is no child labour, given the constant monitoring carried out by the company.

Child labour monitoring mechanisms are in place. Measures are taken to mitigate the risk of child labour, raise awareness of the issue and support children's school education.

the risk of child labour is very low and a child labour monitoring mechanism is in place.

The root causes of child labour (e.g. financial or cultural) are understood. Opportunities for improvement have been identified.

The risk of child labour in a given region and sector is known. But, no action is taken.

Annex II – Developed and developing countries

Worldwide there is a categorization for countries that can place them in developed or developing countries. There are specific characteristics such as the development of the industrial sector, quality of life, per capita income, the human development index, access to education, health, etc. A country with high quality of life and excellent industrial and socioeconomic development is considered a developed country. While if the opposite occurs with the indicators mentioned above, the developing country would be categorized.

Another essential concept is the definition of a conflict zone, where developing countries are generally more prone to these problems. To better understand the concept, a series of indicators has propose among which it stands out (Responsible Jewellery Council, 2013):

- War conflicts in progress, invasions, occupation of territories.
- Forced displacement of the civilian population
- Abuse of authorities with the civilian population.
- Violation of human rights

Table 6. Geneva academy: indicators for conflict-affect and high-risk areas

<p>Between states:</p> <ul style="list-style-type: none"> • One or more states attack another state’s territory or armed forces with ground forces; • One or more states attack another state’s territory or armed forces with air forces; • One or more states’ navies attack another state’s territory or armed forces; and/or • One or more states occupy another state’s territory without the latter’s consent.
<p>Instability:</p> <ul style="list-style-type: none"> • UN Security Council has stated that international humanitarian law applies to a particular situation; • Organised Non-State Armed Group (NSAG) controls territory of a state; • Organised NSAG is fighting with armed forces of a state on a regular basis; • Many civilians are fleeing combat zones; and/or • In failed state or area where rule of law has broken down, members of two or more organised NSAGs fighting each other on regular basis.
<p>Armed conflict:</p> <ul style="list-style-type: none"> • Area falls within territory on which armed conflict is ongoing; • Area contains internally displaced persons fleeing armed conflict, and/or • Area contains a refugee camp or refugees who have fled across the border from a state in which an armed conflict is ongoing.
<p>High-risk areas:</p> <ul style="list-style-type: none"> • The state is no longer effectively able to tackle ordinary crime; • The police or other security forces are killing or beating ordinary people with apparent impunity; • or are conducting widespread, arbitrary arrests of ordinary people; • The police or other security forces cannot enter or patrol safely; • The state cannot provide basic health services and/or primary education; • Children are engaged in dangerous forms of labour; • There are high levels of sexual violence; • People are forced to carry out labour; • Children are being recruited into armed forces or armed groups; • Bribes are demanded for ordinary state services; • The law is not enforced impartially by the judiciary; and/or • Organised crime networks operate successfully and with apparent impunity

Note: Reprinted from “RJC standards guidance”, by Responsible Jewellery Council,2013,p 40