

# **An Italian tomato “Cuore di Bue” case study: challenges and benefits using subcategory assessment method for social life cycle assessment**

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**An Italian tomato “Cuore di Bue” case study: challenges and benefits using subcategory assessment method for social life cycle assessment**

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1 **Abstract:**

2 **Purpose:** The main purpose of this study is to present an implementation of the Subcategory Assessment  
3 Method (SAM) to the life cycle of an Italian variety of tomato called "Cuore di Bue" produced by an Italian  
4 cooperative. The case study was used to use the methodology proposed in compliance with the guidelines of  
5 Social Life Cycle Assessment (S-LCA) in order to highlight issues for the improvement of SAM.  
6 A summary of strengths and weaknesses of the methodology as well as the social performance of the considered  
7 Italian tomato is an important result of this case-study.

8 **Methods:** The methodology used is based on SAM. The UNEP/SETAC guidelines of S-LCA and the  
9 complementary Methodological Sheets were used as main references to carry out SAM and it was used to assess  
10 the social performances of "Cuore di Bue". The focus was on the assessment of three out of five stakeholder  
11 groups presented in the guidelines: Workers, Local Community and Consumers. Specific questionnaires have  
12 been developed to collect the inventory data related to each stakeholder group and along the product life cycle.

13 **Results and discussion:** SAM of "Cuore di Bue" showed a range of values: between 2-3 (C-B) for consumers  
14 stakeholder group, and mainly 3 (B) for the local community and worker stakeholders. Because the best  
15 performance (A) is related to a numerical value of 4 better performances were not identified, owing to no  
16 propagation of actions in the value chain. The collective bargaining, transparency, feedback mechanism and  
17 privacy are the subcategories with the worst performance, but at the same time with more potential for  
18 improvements.

19 **Conclusions:** The implementation of SAM on "Cuore di Bue" allowed us to demonstrate how SAM transforms  
20 qualitative data into semi-quantitative information through a score scale that can help a decision maker achieve a  
21 product overview. SAM has been implemented on "Cuore di Bue": the product assessment, the strengths and  
22 weaknesses of the methodology are identified and discussed as well. It has been possible to present the best and  
23 worst performance in product life cycle, by identifying the phase or the subcategories with good or bad  
24 performance. However, in this case study, as the same company owns most of the product life cycle taken into  
25 account, the majority of social performances are identical and this may represent a limit of the methodology or  
26 that more organizations along the life cycle must be taken into account (for example, energy, distribution).

27 **Keywords** Subcategory assessment method • Social life cycle assessment • Social impact assessment •  
28 stakeholders • Characterization model • Case study  
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## 1 Introduction

The Social Life Cycle Assessment (S-LCA) has, as its main target, the assessment of the social performance of a product along its life cycle. A great amount of literature has been written in the last ten years to identify a set of valid and commonly accepted indicators and its relative characterization factors for the impact assessment (Weidema 2006; Dreyer et al. 2006; Jørgensen et al. 2010; Benoit et al. 2011; Traverso et al. 2012a; Traverso et al. 2012b; Jørgensen 2013; Benoit et al. 2013; Neugebauer et al. 2014; Neugebauer et al. 2015). Although a standard set of indicators has not yet been defined, a framework for the implementation of the methodology has already been developed. The scientific community and users of S-LCA commonly accept the following main points:

- The assessment path should follow the ISO 14040 (ISO 14040, 2006) scheme to be a complementary approach of environmental LCA in assessing the social impact of products (UNEP/SETAC 2009).
- The main topic related to the ILO standards (ILO 1930, 1948, 1949, 1951, 1957, 1958, 1973, 1999), such as child labour, forced labour and so on (Dreyer et al. 2010) need to be considered in the assessment of the workers stakeholder group.
- The indicators are different and depend on the impact categories and the stakeholder groups (e.g. Human Health should be measured with different indicators if it is related to workers, consumers or local communities).
- A possible path to allocate social impacts is to use the quantity of labour hours for each unit process (UNEP/SETAC 2009).

UNEP and SETAC (2009) highlighted the importance of developing methods and case studies to improve S-LCA. In a former study, Ramirez et al. (2014, 2016) presented a Subcategory Assessment Method (SAM) based on UNEP and SETAC (2009).

SAM is able to transform qualitative information into quantitative data (1 to 4; 1 being the worst and 4 being the best), thereby acquiring a semi-qualitative feature. In some cases, the method proves to be consistent by analysing the organizational social behaviour of the product life cycle. In addition, SAM allows for managing different issues in the context of S-LCA, e.g. ranging from a simple to a complex product, and also when the assessment comprises different contexts/countries across the whole value chain. This is owing to basic requirements based on international references, which enables a systematic application.

It was noted that not all elements of regionalization and contextualization of particular situations are considered by the method, especially in small organizations. This is due to the fact that SAM is based on the evaluation of organizational practices in relation to international agreements. The choice of using international agreements is related to the indications given by the UNEP/SETAC methodology. It relies on measures implemented by large organizations having the resources and capacity to acquire social and environmental actions, as was identified by Dreyer et al. (2010).

SAM has been applied to a cosmetic product in Brazil (Ramirez et al. 2016). The current paper aims to use SAM in another context and for another type of product: a specific variety of Italian tomato called “Cuore di Bue” and to assess social performances of its value chain (cradle to gate) from the cultivation of the plants until it is put on the market and sold to the consumers.

The tomato is one of the most diffused horticultural products and one of the most incisive on the fruit and vegetable sector. According to FAO, Italy is the first tomato producing country in EU-27 with approximately 51

tonnes in 2012. However, there has been a structural decrease in the cultivation of the table tomato from 30,000 hectares at the beginning of the millennium to 22,000 hectares in 2012, whereas the quantity of greenhouse table tomato production has grown in the same period from 36 % to almost 50 %.(FAOSTAT | © FAO Statistics Division 2014 | 16 July 2014)

## 2 Goal, scope and system boundaries

### 2.1 Functional unit

The Functional Unit (FU) chosen in this case study is 1 kg of tomato “Cuore di Bue”, which meet the nutritional needs of an individual, thus represents an excellent source of antioxidants, dietary fiber, minerals and vitamins (Ciusa 1979).

### 2.2 Product system

Because the social indicators collected have been related to the product by considering the labour hours, the cut-off criteria are related to the amount of labour hours (Hunkeler 2006) of each process unit. An analysis of all company sites involved in the product life cycle is necessary. The company with the most steps of the product life cycle, is defined as Company A. In order to produce the product it interacts with the other companies of the supply chain. All process units related to company A are considered in the assessment. The other companies in the supply chain are compared to each other in terms of interaction, expressed in percentage of labour hours, with Company A. All process units of the others companies which have an interaction higher than 1 %, are included in the system boundary. Table 1 shows the process units for each considered company.

The calculation of the labour hours of each unit process (minutes or hours) is estimated according to Ugaya et al. (2011) based on the number of employees of the company (workers), the number of working hours per week of each employee, the number of working weeks in a year, and the entire yearly production of the product as shown in Equation (1). The labour hours are calculated by the following equation:

$$Wh = W * h * n / p \quad (1)$$

where:

- Wh is the amount of labour hours
- W represents the number of workers involved in the process unit
- h represents working hours per week
- n represents number of working weeks per year
- p represents total production (kg) per year

The amount of Working hours referred to the FU (WFU) for each unit process is given by:

$$WFU = Wh * c \quad (2)$$

Where “c” is the amount of all materials necessary to produce one FU of tomato “Cuore di Bue”.

The analysis of labour hours was applied to the entire production phase (from cradle to market) (Fig. 1) and included:

- All phases of the tomato production from seedling through cultivation to the harvesting phases and

packaging

- The production and supply phases of packaging products such as: plastic and paper boxes
- Production of coconut slabs necessary as underlay where the tomato plants are positioned
- All transport phases related to tomato “Cuore di Bue” supply chain: from transport of the intermediate and auxiliary materials to the delivery of the final product.

To assess the labour hours of each unit process to produce a FU of tomato “Cuore di Bue”, it is necessary to know all material and energy inputs data related to the tomato production in a year. The relative primary inputs data were collected from the companies involved in the “Cuore di Bue” life cycle.

For each unit process the company production site and the relative number of workers involved per year were considered. Furthermore, all data related to the equation (1) were collected together with the relative input production. The production of a tomato plant and the relative data collected from Company C is an example. All data related to the time (minutes) necessary for each treatment of tomatoes plant is reported in Table 2. The time for each process of annual production was divided by the time for the entire production of one tomato plant.

The production of one tomato plant requires 1.17 minutes. Company C delivers 70,000 “Cuore di Bue” plants to Company A annually. The yearly tomato production of Company A requires 81,900 minutes or 1,365 hours to produce the original plants. The same process was used to calculate the labour hours of each unit process. A summary of the labour hours for each unit process is reported in Table 3.

The next step is to identify those unit processes/companies that are part of the system boundary according to the fixed cut-off criteria: a contribution of labour hours higher than 1 %.

The contribution (in percentage) of each unit process in term of labour hours is reported in Table 4.

According to the cut-off criteria the cardboard box production process and the final transport can be excluded from the system boundary because they present a percentage of labour hours smaller than 0.15 %.

Together with the cut-off criteria, a Social Hotspot analysis is necessary to identify if there are cases of child labour or forced labour that are considered knock-out criteria and whose assessment is needed also when the specific unit process has a bearing of labour hours lower than 1 %. Each single minute of child labour must be considered.

The final system boundaries of the S-LCA of tomato “Cuore di Bue” are reported in Fig. 2.

### 2.3 Selection of stakeholders

According to the definition of S-LCA (UNEP/ SETAC 2013; UNEP/SETAC 2009) the assessment should be related to five stakeholder groups: workers, consumers, local communities, global and national society and value chain actors. We decided to focus the attention on the first three stakeholder groups because, according to a first screening on the data availability and the priorities of the company with whom the case study was made (UNEP/SETAC 2009). The screening process was carried out by considering the company strategy and the data available at the time of the study. The method, although not perfect, is effective. It was important to guarantee the viability of the methodology in this first implementation. It would be interesting to further develop its application in small companies.

In fact, topics such as public commitments to sustainability issues and contribution to economic development related to the neglected stakeholder groups are not easily measurable for the dimension of the company considered, according to UNEP and SETAC (2009).

## 2.4 Subcategory Assessment Method (SAM)

SAM allows the evaluation of organizations by a subcategory, which can later on be linked either to stakeholders or to impacts. As this study aims to perform a case study using SAM, further linkages have not been performed. In order to use SAM, data needs to be collected and compared to Basic Requirements (BR) which were defined according to legislation or organisational practices and country context which results in different levels (Ramirez et al. 2014). An example for the subcategory Forced Labour, is shown in Table 5. If the organization simply fulfills the BR, it is evaluated as B. In the case in which the organization multiplies the BR along the supply chain, an A is given. The difference between C and D depends on the context: e.g. in the case of forced labour, it is related to the country practice. All the remaining description for the other subcategories related to the stakeholders selected, is available in Ramirez et al. (2014).

## 3 Life cycle inventory

Life cycle inventory was carried out according to ISO 14040/44 (ISO 14040, 2006; ISO 14044, 2006) to be consistent with the UNEP/SETAC guidelines and a comprehensive sustainability assessment.

Because many S-LCA case studies have not been carried out till now (Petti et al. 2014), we developed a specific questionnaire for social data collection along the product life cycle based on the Methodological sheets (UNEP/SETAC 2010). The questions are proposed to facilitate the use of SAM and were developed consistently with the UNEP/SETAC guidelines framework in terms of stakeholder and subcategory groups (see Electronic Supplementary Material).

### 3.1 Workers

The first considered stakeholder group for the data collection is workers, including labourers and office workers. Three different questionnaires were developed and each was used for different groups:

- questionnaire for the company administration (office workers);
- questionnaire to collect data from the employees directly involved in the tomato production (labourers);
- questionnaire to interview delegates of trade union.

The aim of interviewing different people is to allow triangulation, that is, to compare data among different sources of information to validate data of the inventory analysis (Table 6). The questions were proposed in such a way so as to confirm (or not) the answers given from the other two interviewed groups. In this case study, only the first two questionnaires listed above were used, as the workers are not members of any trade union.

To further validate the given answers, the national laws and norms and the National Collective Worker Agreement (CCNL) in the agricultural and floriculture sector (Parti sociali 2010), were analysed.

A random sample of 72 employees in the tomato “Cuore di Bue” production were interviewed, representing 95 % of the original population of 93 workers (Corbetta 2003):

$$n = t^2 * P * (1-P) / D^2$$

where:

n is the sample dimension

t represents the distribution

P is the estimated prevalence of the population

D is the absolute precision.

From the interviewed sample, the following was identified:

- 51 men and 21 women
- 5 people aged 16 to 18 years, 34 aged 18 to 30, 23 aged 30 to 40, 9 aged 40 to 50, and only 1 over 60 years of age.

A summary of subcategories and number of questions used to assess the social performance of tomato “Cuore di Bue” on the workers is shown in Table 7. For example, to assess the subcategory *working hours*, 6 questions were asked directly to the workers and 13 to the organization representative. The first question of the workers questionnaire is: How many hours do you usually work per day? Three answer types were identified: a= 8 hours a day, b= more than 8 hours a day and c= less than 8 hours a day. The results were: a = 44 %, b = 37 % and c = 19 %. The assessment of all questions was made in order to respond to the indicator weekly number of average working hours compliant with the law of the sector. If one single answer suggested the non-compliance of this indicator, the processes in the impact assessment (using SAM) would not fulfill the basic requirement (BR) for the subcategory.

### 3.2 Local community

A summary of topics and number of questions used to assess the social performance of tomato “Cuore di Bue” on the local communities is shown in Table 8. The results were related to the questionnaire for the company. A second questionnaire was developed for the person in charge of the local community to check the company answers.

For example, to assess the subcategory delocalization and migration, 6 questions were asked to the organization representative and 5 questions to the community representative. The first question of both questionnaires (organization and community representative) is the following: *Is there any situation that resulted in the delocation of the local community for reasons caused by the organization?* The assessment of all the questions was made in order to answer the indicator *evidence of resettlement caused by the organization*. If one single answer suggested the evidence of this indicator in any processes, the impact assessment (using SAM) would be evaluated as not achieving of the basic requirement (BR) for the subcategory.

### 3.3 Consumers

The stakeholder consumer plays a meaningful role for the success of the product. Tomato consumers are not only represented by the local inhabitants, but also by inhabitants in surrounding large cities. In fact, the company distributes its products to the general markets and supermarkets of the largest cities in Northern Italy, such as Turin and Milan. The carried out questionnaire, totalling 17 questions, is made up of open questions and focuses on consumer health and safety, consumer privacy, end of life responsibility, feedback mechanism and transparency, as shown in Table 9. For example, to assess the health and safety subcategory, the objective was to investigate whether the organization delivered a healthy and safe product to the consumer. For this subcategory, 6 questions were asked. The first checked for any complaint regarding consumers’ health and safety. The remaining questions aimed to identify the procedures used in the organization to deliver a healthy and safe product to the consumer.

The head of marketing answered the questionnaire for primary data. Triangulation, according to the

methodology, is desirable and may occur through consumer organizations. In the case of any reported problem regarding the health and safety of the consumers, due to the consumption of the product, such as intoxication, it

#### 4 Results of the Subcategory Assessment Method (SAM)

For the social life cycle impact assessment (S-LCIA) and its interpretation, the authors used the Subcategory Assessment Method (SAM) (Ramirez et al. 2014). This case study is one of the first comprehensive implementations of SAM. It allows translating qualitative into quantitative indicators throughout a scale definition.

The reference is the basic requirement (BR) that is defined according to the International Labour and Human Rights standard (refer to chapter 2.4).

The life cycle inventory data were then analysed and assessed according to SAM criteria and for each one, the relative score was assigned. The obtained results are discussed and reported in the next chapter (Figs. 3, 4 and 5).

For the Worker stakeholder, the results of eight subcategories are reported: freedom of association and collective bargaining, child labour, forced labour, fair wage, working hours, equal opportunities and discrimination, health and safety, social benefit and social security (Sanchez Ramirez et al. 2012).

According to SAM, B is assigned to the freedom of association and collective bargaining subcategory because no workers were associated to a labour union, they were grouped into a Cooperative, respecting their right to freedom of association.

The other subcategories of the stakeholder workers are all at level B. In fact, all the other subcategories met the minimum standard defined by the relative ILO Conventions. Children no younger than 15 worked in the assessed unit process, which is why the subcategory *child labour* was evaluated with level B.

For the subcategory *fair wage*, no minimum standard has been established at the national level. In Italy as well as in other European Countries (e.g. Germany), the minimum salary is sector specific and is defined by an agreement between labour union organization, government and companies. For example, the minimum wage for the administrative sector in Italy is 965.12 euro per month, for the production sector 6.00 euro/hour for the head of department and 5.20 euro/hour for worker (Parti sociali, 2010), 965.12 euro by month for agriculture sector (FLAI 2008). The company addresses the BR, obtaining B.

The *equal opportunity & discrimination* subcategory was also defined at level B as the company established a management system to avoid, prevent and eventually manage discrimination (Ramirez et al. 2014).

Level B was also assigned to the *social benefit and social security* subcategory; the company recognizes social benefits such as: family leave, sick leave, disability, individual retirement account and health insurance to all its employees. An overview of the results of the stakeholder *worker* evaluation is reported in Fig. 3.

Five subcategories were considered and assessed for the *Consumers* stakeholder: health and safety, feedback mechanism, consumers privacy, transparency and end of life responsibility (Ramirez et al. 2012). The basic requirements were established in compliance with the following International norms and guidelines: ISO 26000 (Corporate Social Responsibility – CSR), Global Reporting Initiative (GRI), and Consumer Protection Act (1987). An overview of the results is shown in Fig. 4, where three out of five subcategories are at level C and the remaining two at B. The *health & safety* and *end of life responsibility* subcategories are evaluated at level B, being as they meet the requirements of the Italian national norms on workers' health & safety of the CSR and of GRI standards.

The other three subcategories do not meet the minimum standard, thus they were evaluated at level C.

1 According to SAM, two different levels can be assigned (C and D), when the company does not meet the  
2 minimum standard. With regard to consumer privacy, the reference is no longer the company's behaviour but the  
3 country where it is located. The evaluation of the country is given in accordance with the International Privacy  
4 Ranking (Privacy International 2007). Consequently, C is assigned if the country, where the company is situated,  
5 has a Privacy International Ranking score from 1.1 to 3 and level D if the country score is between 3.1 to 5.  
6 Level C was assigned to the feedback mechanism subcategory, since no system to trace complaints or consumer  
7 satisfaction was established in the company.  
8

9 According to the S-LCA guidelines (UNEP/SETAC 2009), all subcategories for the local community  
10 stakeholder group have been assessed: delocalization and migration, community engagement, cultural heritage,  
11 respect of indigenous rights, local employment, access to the material resources, access to immaterial resources,  
12 safe and healthy living condition, secure living conditions. The results (Fig. 5) show that only one subcategory  
13 (access to material resources) meets the standard and is evaluated at B. In order for the criteria of these  
14 subcategories to be verified, company audits and inspection of the company code of conduct were carried out.  
15 The *access to immaterial resources* was evaluated at level D, as no activity, in terms of education and  
16 information for the local community, has been identified.  
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## 24 **5 Discussion and conclusions**

25 The present study shows the feasibility of the SAM method for the evaluation and the interpretation of the  
26 inventory data of the S-LCA. The inventory data were collected by considering the framework presented by the  
27 Guidelines and the Methodological Sheets of UNEP/SETAC (Benoit et al. 2011, Benoit et al. 2009). Some  
28 phases had to be excluded from the case study because no primary data were available and no secondary data for  
29 the social indicators chosen could be used. The data collection of this case study shows how detailed and time-  
30 consuming this can be for S-LCA. However, it highlights how elaborate data collection is and how it can better  
31 contribute to the understanding and interpretation of the real social status of the processes. Bearing in mind that  
32 the primary data for S-LCA is usually qualitative, the more information that is obtained, the more veritable the  
33 reality is represented. This occurs in the Workers stakeholder as it was possible to interview almost 100 % of  
34 the workers of the organization. The direct interview enabled the interviewer to better understand the real  
35 situation and link it to the assessment. This kind of sensitivity is always more important when performing an S-  
36 LCA.  
37

38 Moreover, this case study represents one of the first implementations of the S-LCA using SAM and also  
39 represents the first assessment of an Italian tomato.  
40

41 In the tomato "Cuore di Bue" case study, 77.27 % of the assessed subcategories achieved the basic requirements.  
42 In this case study, the method does not allow for outlining a difference between the worst and the best social  
43 performance. This is due to the fact that the product phases assessed are performed by the same organization and  
44 consequently present an identical social performance. However, it is still possible to differentiate the worst  
45 social performance in relation to each subcategory (Table 10). Table 11 shows a summary of the results: for each  
46 SAM result and related evidence a measurement was suggested to the company for improving its social  
47 performance.  
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49 For example, the "access to immaterial resources" subcategory from local community stakeholder presented the  
50 worst performance. The organization neither offers services to the local community nor creates educational  
51 initiatives to the community members with the purpose of sharing information and knowledge. This can be  
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1 attributed to the small size of the company, which has insufficient resources to perform such activities. In  
2 addition, the analysis highlights a lack of proactive actions towards suppliers and other actors in the value chain.

3 More specifically, the company reveals a weak customer satisfaction management system: the creation of a  
4 website providing a direct contact with the customer, could represent a significant improvement.

5  
6 However, company A, along with the environmental certification, implemented the present S-LCA to improve  
7 its social performance. Since the company has already offered high quality products in compliance with the  
8 norms for consumer health and safety, it could improve its visibility and engagement of the local community.  
9 The results of the SAM assessment has led the company to draw up the following action plan (Table 11):

- 12 • Related to the stakeholder *consumers*:
  - 13 ○ Offer a health and safety product according to the sectorial and national norms.
  - 14 ○ Traceability of consumer satisfaction
  - 15 ○ Assessment and electronic storage of consumers' complaints.
- 16 • Safeguard of the workers:
  - 17 ○ Use of safety tools during the distribution phase of fertilizers and pesticides
  - 18 ○ Use of safety and properly managed equipment
  - 19 ○ Training and education of the employees.
- 20 • Safeguard of the local community:
  - 21 ○ Increase of the local community's awareness of social and environmental topics
  - 22 ○ Initiatives to improve awareness of the social and environmental topics of the local community.

23  
24 In conclusion, SAM proves to offer a transparent analysis of the organizational social behaviour of the tomato  
25 “Cuore di bue” in a gate-to-gate perspective.

26 In this study, we deliberately consider all criteria with the same relevancy, but a case study with a ranking of the  
27 proposed criteria should be carried out for verifying if the criteria are all relevant for the tomato sector.

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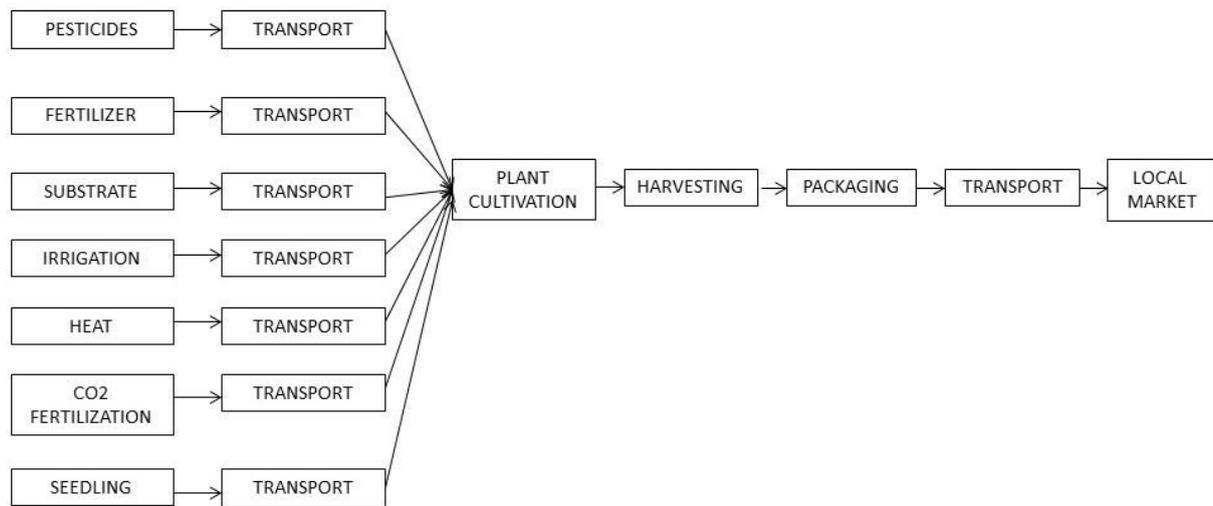
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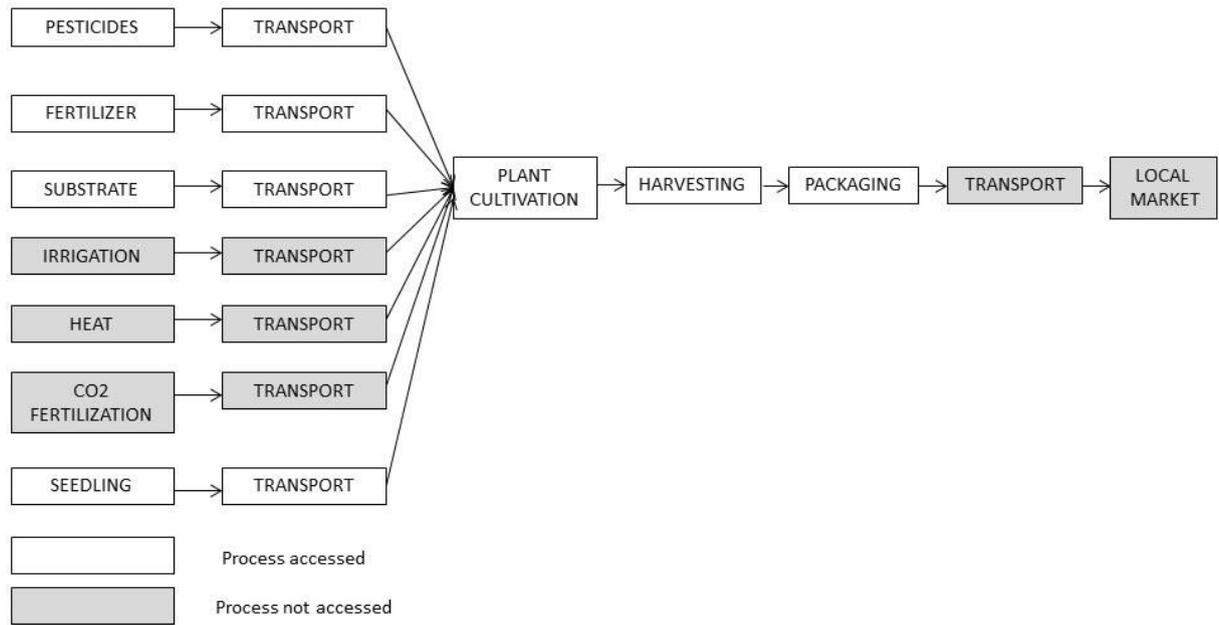
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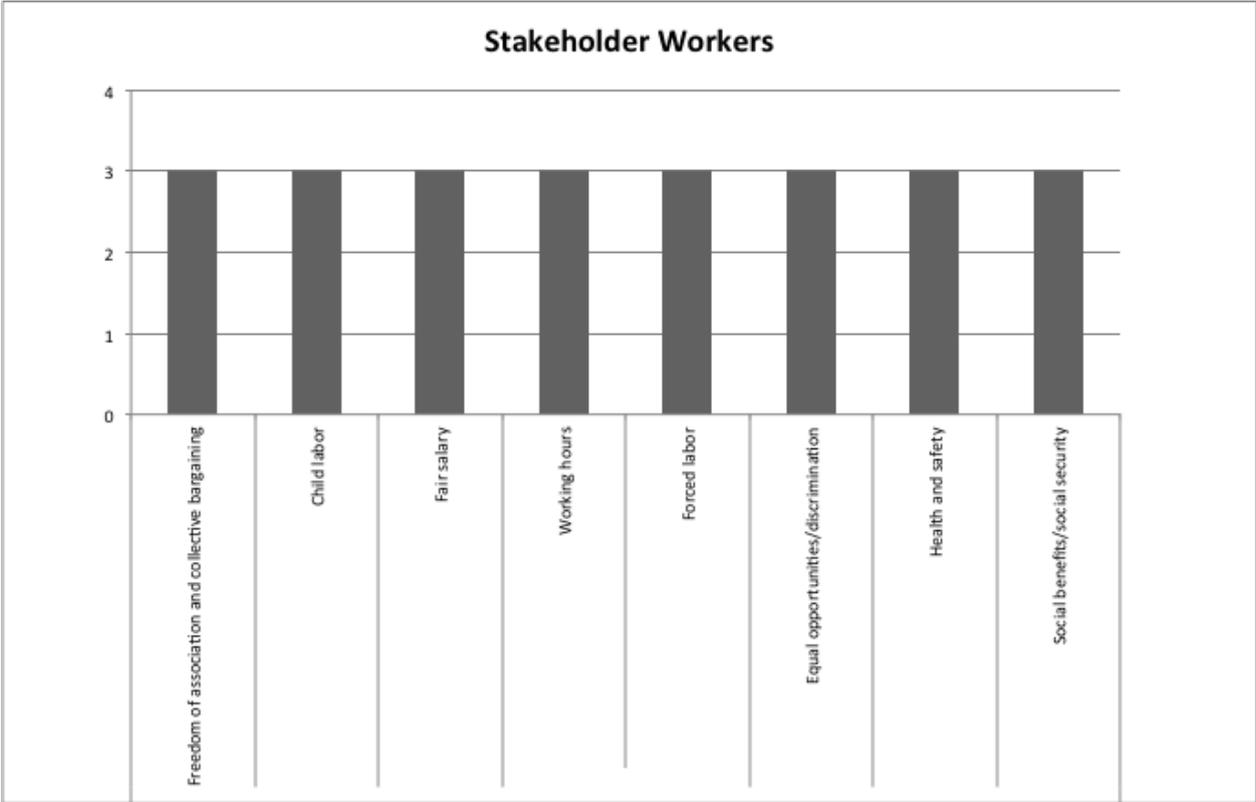
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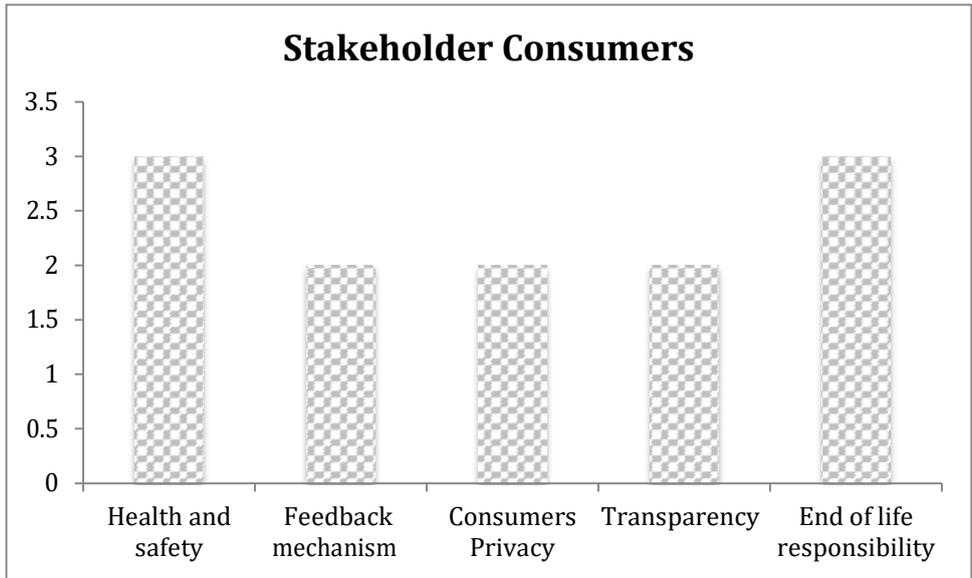
**Fig. 1** System boundary of all the production phases considered in the labour hours analysis



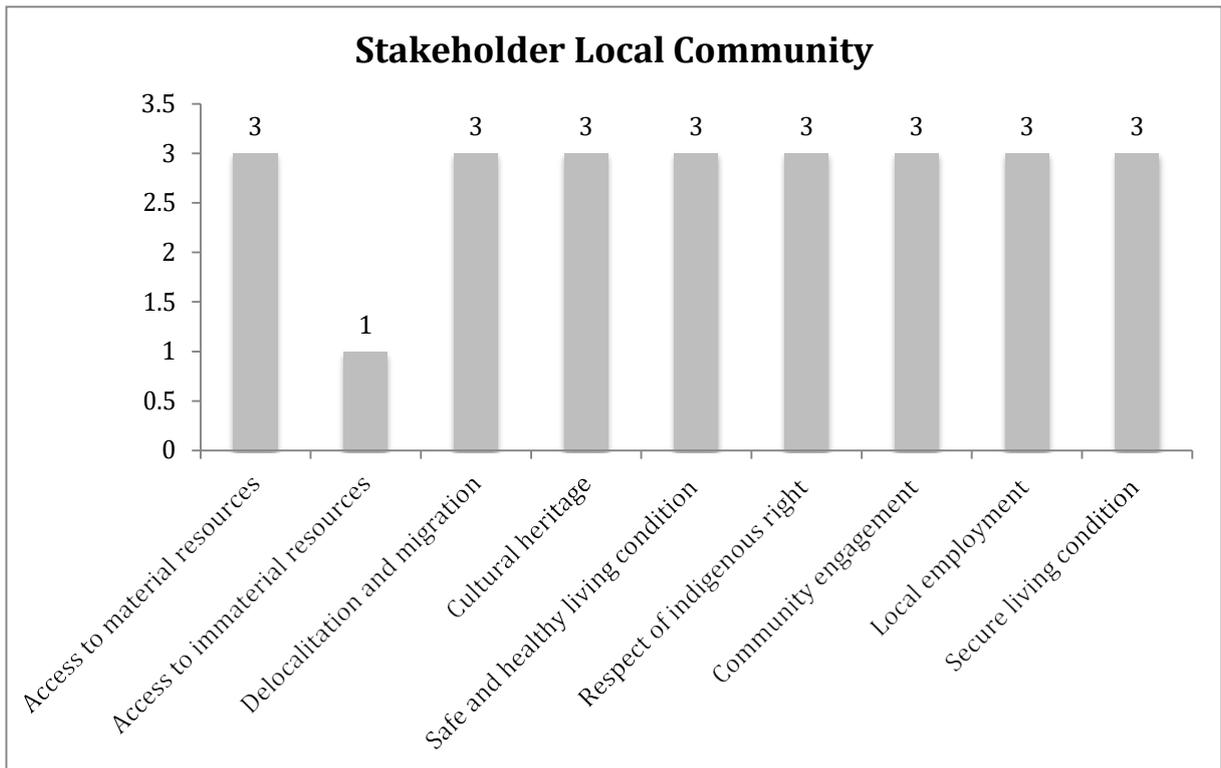
**Fig. 2** Flowchart of the all the considered production phases considered in the case study



**Fig. 3** Overview of the results of the workers subcategories' assessment evaluation



**Fig. 4** Results of consumers stakeholder subcategories evaluation



**Fig. 5** Results of local community stakeholder subcategories evaluation

**Table 1.** Companies involved and relative unit processes of tomato “Cuore di Bue” production

Phytosanitary Products & Trasportation	Plant Production & Trasportation	Coconuts layers & Trasportation	Packaging & Trasportation	Plantation, Harvest & packing	Final Trasportation to the seller
Company B	Company C	Company D	Company E	Company A	Company F  Company G  Company A

**Table 2** Labour hours (minutes) for the production of a tomato plant

Production phase of a plant	Labour Minutes
Seeding	0.03
Relocation in Greenhouse	0.0075
Plantation post seeding and post-graft	0.015
Logistic pre- and post-graft	0.12
Transplanting	0.15
Trimming	0.10
Monitoring	0.3
Selection	0.03
Placement and hydration of cubes	0.04
Spacing of the cubes	0.375
<b>Total Time needed to produce a plant</b>	<b>1.17</b>

**Table 3** Summary of labour hours for each process unit

Process	Company	Transportation	Labour Minutes
Phytosanitary Distribution	Company B	Company B	1.725,5
Plants Production	Company C	Company C	1.465
Coconuts slab Production	Company D	Company D	4.653
Plantation, Harvest and Packing	Company A		98.988
Cardboard boxes Production	Company E	Company E	120
Final Delivery (Transport)	Company F		70,2
	Company G		147,6
	Company A		360
<b>Total</b>			<b>107.529,3</b>

**Table 4** Summary of process unit labour hours contribution

Process	Labour Hours (h)	Percentage of hour
Phytosanitary Distribution	0,00088	1,61%
Plants Production	0,00075	1,37%
Coconuts slab Production	0,00237	4,32%
Plantation, Harvest and Packing	0,05038	92,03%
Cardboard boxes Production	0,00006	0,11%
Final Delivery – Company F	0,00004	0,15%
Final Delivery – Company G	0,00008	0,14%
Final Delivery – Company A	0,00018	0,33%

**Table 5** Organization level of SAM for forced labour

<b>Level</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>
Description	Multiplies BR practices along the life cycle	The organization has a policy against forced labour, in compliance with ILO Conventions No.29 and No.105 (ILOLEX 2012) or there is no use of forced labour	There is evidence in the organization of the use of forced labour as well as in the country where the organization is located.	There is evidence in the organization of the use of forced labour but there is no evidence of forced labour in the country where the organization is located.

Source: Based on Ramirez et al. (2014b)

**Table 6** Triangulation data by stakeholder

Stakeholder	Primary data	Triangulation
Workers	Business owner of the organization	Workers of the organization (72 interviewed)
Consumers	Marketing responsible of the organization	Web sites (as Istituto nazionale di statistica (Istat), <a href="http://www.agricolturanotizie.com">www.agricolturanotizie.com</a> ) and local health authority (as azienda sanitaria locale (ASL) in Italy)
Local Community	Marketing and human resources responsible of the organization	District responsible identified directly by the organization

**Table 7** Questionnaire relative to the workers stakeholder group

<b>Subcategory</b>	<b>No. of Questions</b>	<b>Results of the inventory questionnaire</b>
Freedom of Association	3 Questions to the workers / 11 Questions to the organization representative	No workers were members of a union, but members of the cooperative company
Child labour	2 Questions to the worker / 7 Questions to the organization representative	Presence of policy against child labour.
Fair Salary	4 Questions to the workers / 10 Questions to the organization representative	The lowest salary is equal or higher than the minimum wage of the Italian agriculture sector
Working hours	6 Questions to the worker / 4 Question to the organization representative	Weekly number of average working hours is compliant with the law of the sector
Forced labour	3 Questions to the worker /5 Questions to the organization representative	Presence of policy against forced labour.
Equal opportunities/Discrimination	9 Questions to the worker / 4 Questions to the organization representative	The organization promotes equal opportunities for workers
Health & Safety	12 Questions to the workers / 13 to the organization representative	The organization invests in and trains its employees with relation to accident prevention programs
Social Benefit / Social Security	2 Questions to the worker / 3 Questions to the organization representative	The organization provides more than two social benefits listed in the basic requirement
Source: Vicoli R. 2012		

**Table 8** Questionnaire relative to the Local Community stakeholder group

<b>Subcategory</b>	<b>Num. Questions</b>	<b>Results of the inventory questionnaire</b>
Access to material resources	6 Questions to the organization / 5 Questions to the local community representative	Certificate Global Gap e Lotta Integrata
Access to immaterial resources	3 Questions to the organization / 2 Questions to the local community representative	No evidence of the promotion of community services (health / education / information sharing in)
Delocalization and migration	6 Questions to the organization / 5 Questions to the local community representative	No evidence of resettlement caused by the organization
Cultural heritage	4 Questions to the organization / 3 Questions to the local community representative	Community and its subsistence is considered an activity of cultural heritage preservation
Safe and healthy living conditions	5 Questions to the organization / 4 Questions to the local community representative	Certificate Global Gap e Lotta Integrata
Respect of indigenous rights	3 Questions to the organization / 2 Questions to the local community representative	Communities and the regions were already occupied by similar activities and there is no conflict with the local community
Community engagement	6 Questions to the organization / 5 Questions to the local community representative	The organization actively participates in events of the local community (“sagras and banco alimentar”)
Local employment	3 Questions to the organization / 2 Questions to the local community representative	It uses local employees
Secure living conditions	3 Questions to the organization / 2 Questions to the local community representative	The organization does not reveal any conflicts or problems with the local community proven by the absence of judicial appeals to the organization

**Table 9** Results of the questionnaire relative to the consumers stakeholder group

<b>Subcategory</b>	<b>Num. Questions</b>	<b>Results of the inventory questionnaire</b>
Health & Safety	6 questions	The company doesn't receive any complaints on health and safety issues from its consumers; but the company doesn't promote healthy and safety practices and policies with its own business partners.
Feedback Mechanism	3 questions	No feedback mechanism are available but the consumers can still reach the company by telephone or by email.
Privacy	3 Questions	No policy to guaranty consumers' privacy.  No protection of consumers data supplied by internet  No policy or actions to protect the suppliers' privacy
Transparency	3 Questions	The company doesn't communicate its social corporate responsibility but implement environmental and social tool for the impact assessment such as water footprint and LCA
End of Life responsibility	2 Questions	The company gives clear information for consumers on the end of life treatment of its product. But it doesn't promote policy and practices with its business

**Table 10** SAM: Scale for the interpretation of the qualitative indicators into quantitative ones (Sanchez Ramirez et al. 2014)

Scale of levels	A	B	C	D
Numerical scale	4	3	2	1

**Table 11** Summary of the SAM assessment results and relative action plan measures

Stakeholder groups	Subcategory	Results of SAM	Evidence	Measurement
<b>Consumer</b>	Health and safety product	B	The organization invests and trains its employees in relation to accident prevention programs	Setting of the contract with its suppliers to act according to the to sectorial and national norms/ And continue to offer a health and safety product according the to sectorial and national norms.
	Feedback mechanism	C	There is not measures which enable the consumer to make complaints, such as providing a suggestion box on the help desk or a customer care section on the website	Tracebility of consumer satisfaction / Assessment and electronic storage of consumers' complaints.
	Consumer privacy	C	there is no formal policy on privacy within the organization	Provide a formal policy on privacy within the organization
	Transparency	C	The organization has no formal report on social responsibility, but demonstrate practices to its suppliers	Provide formal report on social responsibility with access to consumers
<b>Workers</b>	Health and safety product	B	The organization invests and trains its employees in relation to accident prevention programs	Use of safety tools during the distribution phase of fertilizers and pesticides
				Use of safety and properly managed equipment
				Training and education of the employees.
<b>Local Community</b>	Safe and healthy living conditions	B	Certificate Global Gap and "Lotta Integrata"	stablish by contract with its suppliers to act properly according to law regarding safety and health of workers/ And Continue to offer: Increase of the local community's awareness of

			social and environmental topics
			Initiatives to improve awareness of the social and environmental topics of the local community.
	Access to immaterial resource	D	Not evidence of the promotion of community services (health / education / information sharing in) Offer education and information to the local community

\* The suggestions for na action plan are provide mainly were the results does not meets the basic requirement or na small effort of the organization is sufficient to prove the preformance