True Cost Accounting for Food, Farming & Finance (TCA-FFF)

Eosta, Soil & More, EY, Triodos Bank and Hivos, 2017

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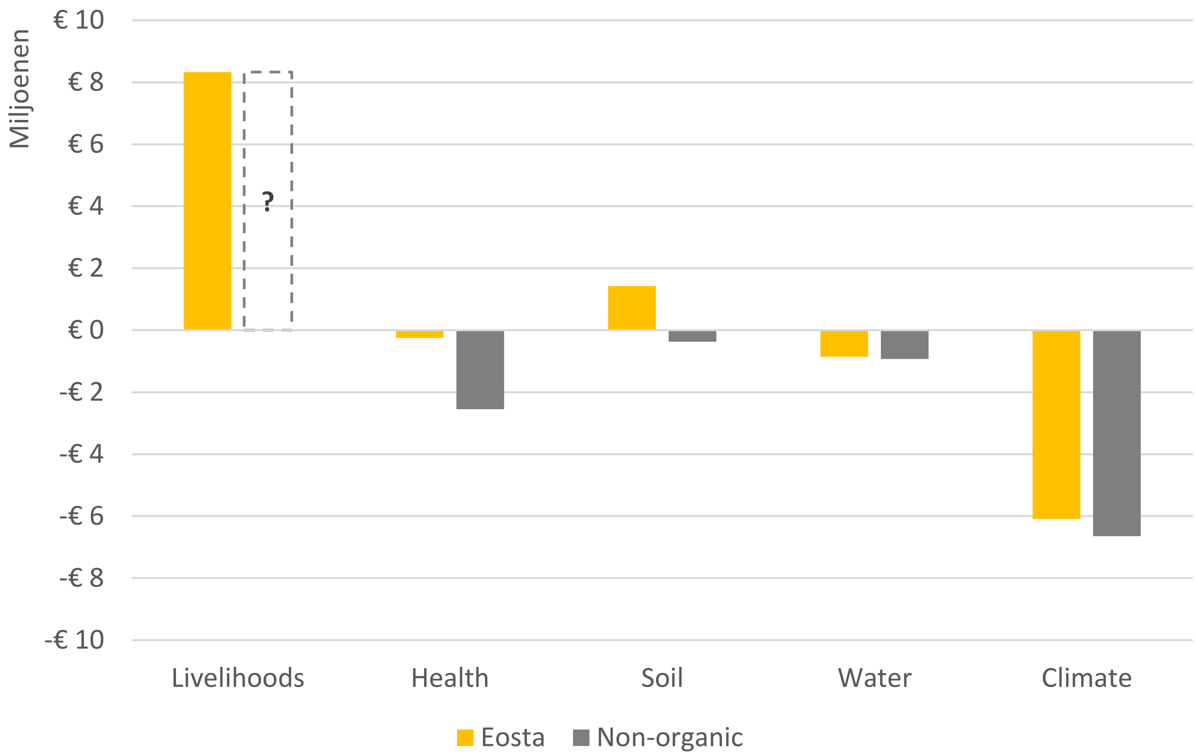
Management Summary

In this report, Eosta presents the true cost of various fruits & vegetables and an TCA-based integrated profit&loss (IP&L). It is the first Small and Medium Sized Enterprise (SME) to do so. It is part of Eosta's journey to continuously lead and innovate in (organic) food & farming.

Value creation is what drives investors to invest and it informs decision making by business leaders to manage their business. But in reality true value creation is hidden under the surface and merely a qualitative factor in investment or business decisions. The reason being that companies create externalities, positive and negative, that remain unquantified as well as unpriced. Being aware of 'what gets measured, gets managed', Eosta has therefore taken the initiative to start measuring its (true) value creation by means of a true cost accounting pilot for which the results are presented in this report. Hence this pilot reveals the impact of the company, of value that usually remains hidden with most companies. Eosta is the first SME in the food & agri business to present such results.

This pilot revealed that socio-economic impact (Livelihoods) as well as climate change remain the most significant impacts to focus on. But we also found that Health, due to negative pesticide impacts, is material to consumers for certain fruits and vegetables. For Apples we found a 0,19 cents difference per kg Health impact when Eosta and non-organic are compared, favorable for Eosta's organic apples. The 2015 integrated P&L at Eosta level is shown below.

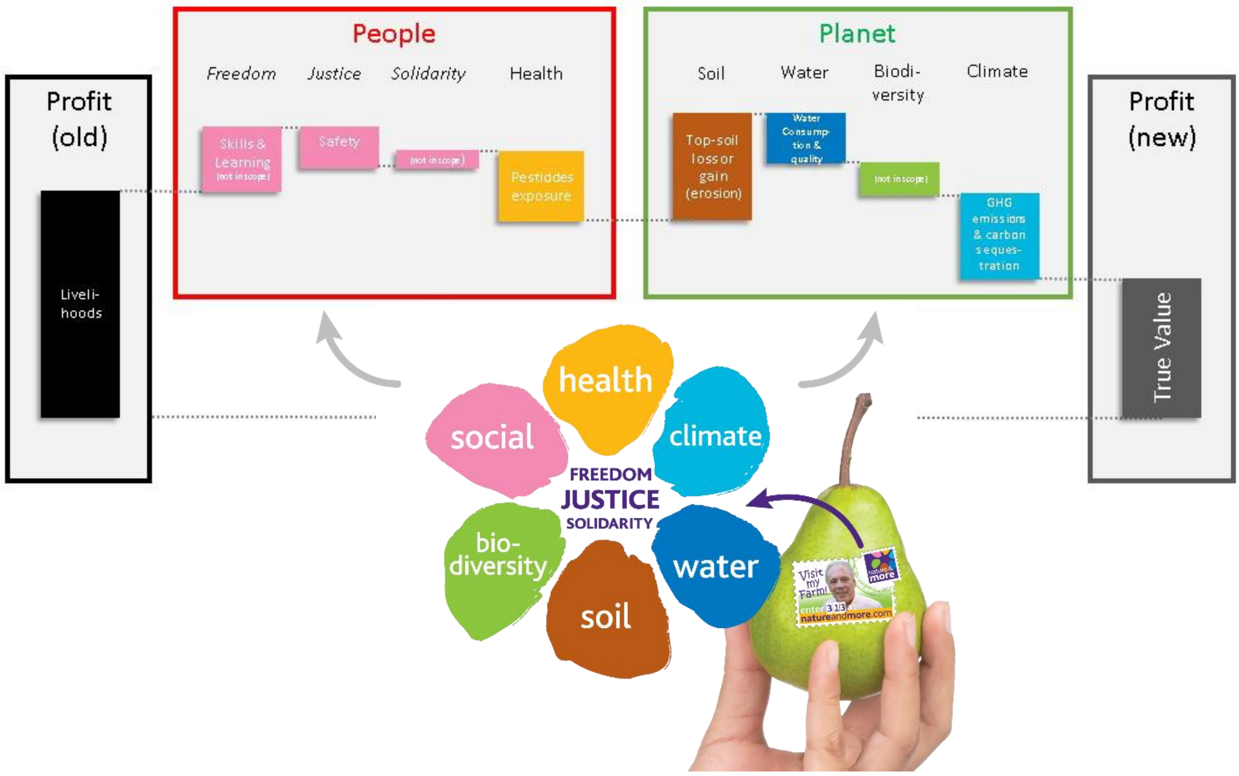


We use the dotted bar to illustrate the impact of a non-organic trading company. Due to lack of data we are not able to estimate the economic impact of non-organic companies but include it in our graphs for comparative purposes.

The resulting integrated P&L for this pilot is an initial step towards a reliable and robust set of methodologies, key performance indicators (KPI's) and approach. It is focused on a limited number of impact categories where others are left out. The selection of impact categories is based on a previously conducted materiality assessment. It is recognized that further work is needed to include more impacts as well as to improve data accuracy on the impacts included. The next step is to broaden and deepen the scope of analysis. The most important improvement areas currently identified include:

1. Inclusion of water scarcity, the pilot focused on water quality (emissions to water). Water scarcity data requires more detailed data on local data sources which is currently lacking.
2. Inclusion of soil fertility – in this integrated P&L, only soil erosion has been included. Soil fertility is a complex topic and strongly subject to debate. Moreover, soil fertility is partially internalized and hence part of future earnings. This topic requires further work with a wider group of stakeholders and experts from the organic as well as from the non-organic movement.
3. Inclusion of livelihood impact measurement at farm level, supported by local data.
4. More detailed data gathering on pesticide use to support more details life cycle assessment of health impacts
5. The current integrated P&L at Eosta level is a consolidated P&L based on the data of several farms. More data is required to get a more refined and robust result.
6. Another one could be linkage/reference to the sustainable development goals of the United Nations (SDG's).

The complete framework with all impact categories included is schematically shown below, mapped onto the Sustainability Flower which serves as the underlying sustainability model. Eosta uses the Sustainability Flower as a model to evaluate, manage and communicate the sustainability achievements of organic growers.



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1 Introduction: True Cost Accounting for Food, Farming & Finance

Multiple crises - from the now chronic economic crisis, through the alarming increase of nutrition-related diseases and antibiotic resistance, to climate change challenging farming' viability in several areas – call for a radical change in measuring, and consequently, taking informed decisions on full costs and benefits. 'Profit' needs to be re-defined in order to overcome perverse incentives in the investment-, food- and farming sector. Sustainable development depends on our ability to correctly account for economic, environmental and social costs, risks and dependencies, and integrate them into a single decision-making tool.

Several initiatives have emerged in the last few years, with a view to support this emerging need, including: the Natural Capital Protocol (NCP), Social Capital Protocol (SCP), The Environmental and Economics of Biodiversity for Food and Agriculture (TEEB AgFood), BioNext, the Sustainable Organic Agriculture Action Network (SOAAN/IFOAM) as well as several overviews and guidance documents of the World Business Council for Sustainable Development (WBCSD). While these initiatives offer harmonized frameworks for businesses, the choice of metrics is left open to users. In particular, SME's need guidance on Key Performance Indicators to use for assessing and monetizing societal impact of their operations.

Given the emergence of available standards and practices, it was decided to take it to the next level for Eosta in the form of a pilot project. Based on the NCP framework and in accordance with the outline of SOAAN/IFOAM, it was proposed to develop a practical tool for True Cost Accounting in the Financial-, Food- and Farming sectors (TCA-FFF). In particular, the NCP "Measure and Value" stage will be developed with metrics specific to economic, environmental and social performance of SMEs engaged in finance, food and/or farming. The outcome being a business-shared TCA-FFF Dashboard to measure and monetize impacts on planet and people. It provides insight into the key set of impacts. The ultimate objective of the TCA-FFF tool is to overcome perverse incentives in small and medium food supply chains, in support of ethical enterprises and green financing. Partners in this pilot are the following:

- **Finance:** monitoring and reporting on the true cost of financing of Triodos Bank and GLS Gemeinschaftsbank (Germany) by applying the Dashboard for Profit/Loss balance sheets, investment- and loan assessments.
- **Food:** monitoring and reporting on the true cost of food of Nature & More and Lebensbaum, by applying the Dashboard for the communication of the true cost of food in the market place.
- **Farming:** monitoring and reporting on the true cost of small and medium-size (organic) farms supplying the above-mentioned food partners, with a view to generate consolidated supply-chain assessments. IFOAM will oversee the application of the Dashboard to assess the true cost of farming to policy-makers and/or sustainable procurement agents.

This project is carried out by EY and Soil & More International (SMI). SMI already carried out a series of true cost assessments on different fruit and vegetable as well as coffee, tea and dairy supply-chains from different regions worldwide. EY has been involved in the development of the Natural Capital Protocol.

2 Scope and objective of the pilot project

The initial part of this project is focused on a subset of impacts. Hence the pilot is not aiming to deliver a complete overview of all environmental & social impacts. Key Performance indicators have been identified for monetizing economic, environmental and social performance, based on international and business-agreed frameworks and methodologies, such as the FAO's (Food and Agriculture Organization of the UN) Sustainability Assessment for Food and Agriculture systems (SAFA) Guidelines, Natural Capital Coalition, TEEBAgFood and the WBCSD. These frameworks will also guide methodological steps, such as the definition of boundaries according to spheres of influence, participatory definition of sector-relevant materiality, relevance and pragmatism following the 80/20 rule (80% of impact is made with 20% of indicators). While environmental KPIs are relatively developed, monetary valuations and approaches largely differ. Social KPIs are in an early stage of development and monetization, such as Quality Adjusted Life Years for health, provides challenges that require a different approach, such as the Subjective Wellbeing Valuation. The interpretation and integration of existing frameworks is required for SMEs, as well as agreement among them on a common dashboard for monetizing impacts and dependencies.

The impacts that are included in the analysis include the following:

1. **Livelihoods** – primarily consisting of the socio economic impact of Eosta's activities. At the moment, Eosta has insufficient reliable data available on Livelihoods at farm level.
2. **Health** – with a primary focus on consumer health impact due to pesticide exposure. Worker Safety is also accounted for although it is found to play a minor role.
3. **Climate** – primarily due to greenhouse gas emissions (CO_2, CH_4 and N_2O) and carbon sequestration. This includes the scope 3 emissions of applied/purchased organic and chemical inputs such as fertilizers and pest and disease control products.
4. **Water** – primarily due to water pollution. Eosta does not have sufficient water scarcity data available to measure this impact in a reliable way. Therefore, this impact is estimated based on water use and water pollution.
5. **Soil** – Soil is limited to soil erosion. Soil fertility is left out of scope due to the lack of consensus on how to measure and value it.

The products and countries of origin in scope of our assessment are the following:

Product name	Country of origin
Apples	Argentina
Tomatoes	Netherlands
Pineapples	Costa Rica
Lemons	Chile
Oranges	Egypt & South Africa
Pears	Argentina
Avocados	Kenya
Grapes	South Africa
Carrots	Netherlands

Table 1 - Products in scope and country of origin

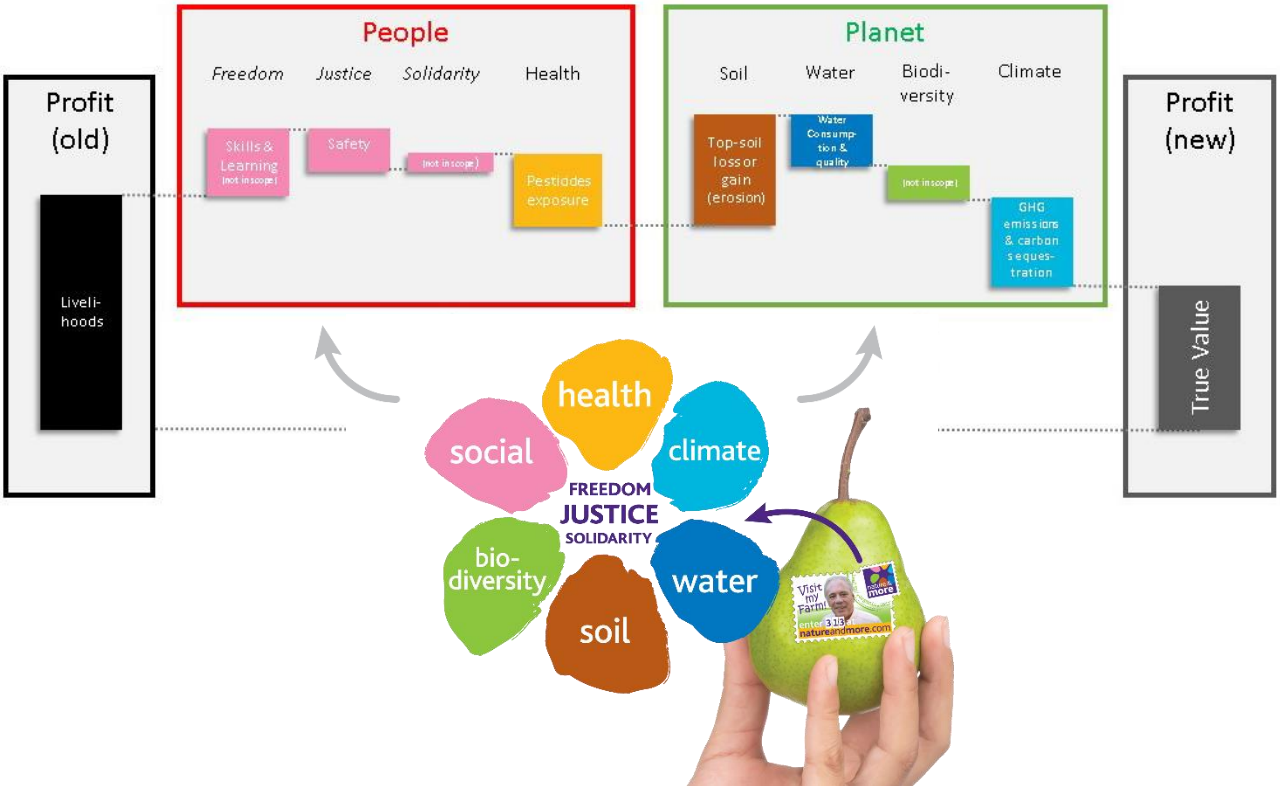
Apples from Argentina, tomatoes, pineapples, lemons, oranges, pears, avocados, grapes and carrots. For the majority of the products data come from 1 farm with the exception of oranges where data come from two farms. For our calculation, the results for oranges are averaged. Where ever possible we use conventional farming data from same supplier – if they had both organic and conventional fields. Generally, but in particular regarding pineapples, it is interesting to see that more and more organic/biological practices are adopted even within the conventional fields which lowers the difference in impact but is a good signal that organic practices are actually paying off better.

2.1 The 'Sustainability Flower' framework as foundation

Eosta is one of the users of the 'Sustainability Flower'. It is being used as a model to evaluate, manage and communicate the sustainability achievements of organic growers. The formal KPI framework that underlies the Sustainability Flower measures sustainability impacts by nine dimensions: six dimensions for the Planet (Soil, Water, Air, Animals, Plants, Energy) and three dimensions for People (Cultural, Social and Economical life, re-named by EOSTA as: Freedom, Justice and Solidarity). For a more intuitive visual presentation in accordance with the approach of the FAO (2014) towards True Cost Accounting, these nine dimensions were regrouped into five dimensions: Social (Freedom, Justice and Solidarity), Soil, Water, Biodiversity (Animals and Plants) and Climate (Air and Energy). Health was not included in the original grower-oriented framework but was added for TCA purposes.

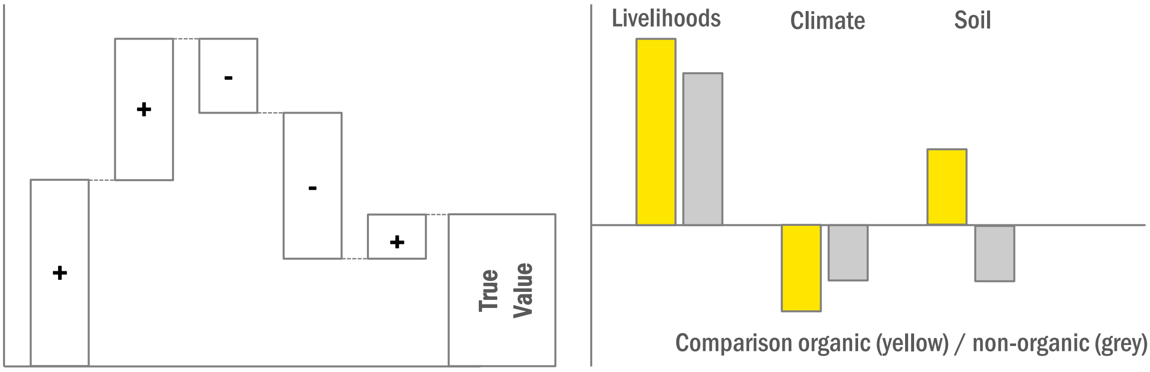
The sustainability flower was developed from 2009 onwards by an international think-tank of prominent pioneers and innovators of the organic movement, operating as the "Belbis Desert Club". Among them are the founders and leaders of Ambootia, Alnatura, Eosta / Nature & More, IFOAM, Lebensbaum, Rapunzel, Schaette, Sekem, Soil Association, Soil & More, and others. For each aspect of the flower, KPI's were defined on the basis of the Global Reporting Initiative (GRI) Guidelines.

Below a mapping is performed of the flower, the impact categories in scope as well as the traditional (PPP) 'triple bottom line' in an indicative waterfall diagram. In the Profit category, Livelihoods represents the economic value creation by Eosta for different stakeholders involved, which includes net profit, employee benefits and government taxes.



2.2 Graphical presentation in this report

Within the report, we typically use the following two types of presentation:



Firstly we present a waterfall diagram (left-hand graph above). In a waterfall presentation all individual impact areas are added up in a cumulative way, enabling a visualization of materiality as well as revealing the total value. As opposed to the waterfall diagram we use comparative diagrams (right-hand graph above) to reveal the difference between the organic and the non-organic alternative. This allows for a better comparison of the individual impact areas.

2.3 Roadmap of TCA until 2018

This pilot is an initial step in the innovation and application of True Cost Accounting (TCA) in the food & agri sector. This pilot demonstrated that valuable insights can be gained from TCA and that it can be used to transform businesses by informing decision makers. It is also recognized that further steps be made to make TCA more robust and more complete in terms of coverage. Hence, the pilot is just an initial step in a more comprehensive initiative to further professionalize, innovate and mainstream TCA. In this section we highlight the most important aspects that need to be tackled in 2017 and 2018 to make TCA more 'fit-for-purpose'.

1. **Making TCA more robust & specific** – for several of the fruits & vegetables in the underlying study, generic data was used. This is especially true for the socio-economic as well as the human capital impacts. For instance, to account for the pesticide impacts, median impact data was used as no specific pesticide application data was available as farm level. A next iteration is needed to make TCA more specific. The inclusion of water scarcity will also be needed to make the TCA more complete.
2. **Inclusion of balance sheet concepts** - At present TCA is focused on P&L accounting. Balance sheet concepts are not yet taken into account in the majority of TCA initiatives. A balance sheet concept is especially useful in its relation to soil degradation as it enables to account for time effects related to *e.g.* soil organic matter (SOM, humus) build-up which typically extends several years or even decades. A balance sheet concept enables asset or liability thinking for natural as well as social capital.
3. **Inclusion of soil fertility, water scarcity & biodiversity**– The food and agri sector starts and ends with soil being its most important asset. This pilot has a limited scope as –in relation to soil- only soil erosion was included. Soil fertility as driver for sector sustainability is therefore a critical next step to make. A similar argument can be made for biodiversity. Both soil fertility as well as biodiversity are challenging topics which currently are subject to debate. This initiative will need to align to existing initiatives in the market. In addition, water scarcity will be considered in a later version as many of the products are actually sourced from water scarce regions. During the creation of this report, a research proposal on soil fertility was already in the making.

4. **Mainstreaming within the sector through transparency & tooling** – A critical step to enable mass adoption is to provide transparency over methodologies used including their assumptions & limitations. It will help to attain continuous improvement over the years to follow. It is also envisaged to develop a pragmatic tool for the following users:
    a. **SME's and corporates –** More and more food & agri business take responsibilities over their supply chain impacts. In reality however, many companies struggle with gathering robust data at farm/supplier level. A pragmatic data gathering solution could help companies overcome such challenges. It will help these companies provide transparency over their supply chains. It will also help them drive supply / sourcing decisions in search of long term value creation.
    b. **Farmers / growers -** Farmers struggle with day-to-day decisions that impact long term profitability over short term income. A pragmatic tool to help deliver recommendations and insights to farmers may help to drive field-level sustainability. This could especially be useful if longer term cash flows (driven e.g. by internalized externalities) could be visualized made specific for farmers. Therefore, within this initiative a tool is envisaged that can be readily applied in the field to enhance a farmers' operational decisions related to field-level sustainability.
    c. **Consumers –** a consumer TCA dashboard could enable consumer buying decisions.
    d. **Banks & Investors**

3 Results & interpretation

In this section, we present our results at company as well as product level. Due to data restraints both at company and product level, the economic capital impact for the non-organic equivalent of Eosta cannot be estimated. To enable the comparison these impacts are depicted as equal to the impact of Eosta and marked with a question mark.

3.1 IP&L

Figure 1 shows the IP&L account of Eosta for 2015 compared to a non-organic fruits & vegetables trading company, which was modelled based on industry averages and the assumption that margins of organic and non-organic are similar.

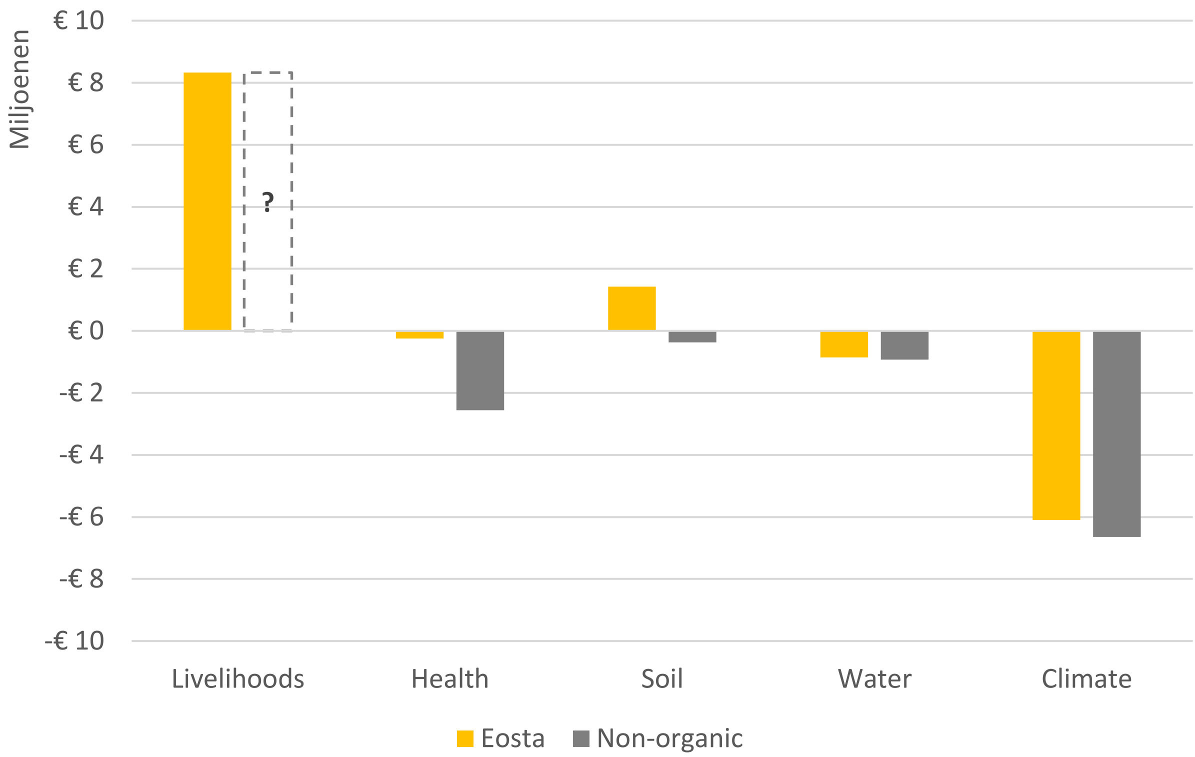


Figure 1 - Eosta vs Non-organic company IP&L account for 2015

Due to lack of economic data, the Livelihoods impact of the non-organic company is assumed to be equal to the Livelihoods impact of Eosta therefore the difference in impact is assumed to be zero. However, when compared to their net profits Eosta contributes to a total positive impact to Livelihoods that is approximately 5 times larger. The Safety impact is negligible and therefore left out from this graph.

The most significant difference in impact occurs at Health with the non-organic company showing approximately 2,3 million € larger negative impact. This impact is fully attributed to the use of Pesticides that end up from the farm to the consumer. Worker's health due to pesticide use is also taken into account in this assessment but considered negligible given the data available. Counterintuitively, Eosta shows a small contribution to the Health impact of 0,25 million €. This company-specific estimate is derived based on primary data on encountered pesticide residues. Eosta reports pesticides encountered in 0,28% of specimens tested and therefore the calculated approximate reduction of pesticides impacts for Eosta produce is 89,23% (see section 4.2 for more details on this approximation).

Compared to the above, the differences between the two companies in Climate and Water are less distinct and were estimated at 0,5 and 0,07 million € respectively. This result shows that despite the large differences in production methods, organic and non-organic products can have similar impact in terms of GHG emissions and Water use and quality. Nevertheless, organic products outperform non-organic products and therefore help reduce the respective impacts.

Another interesting finding is the difference in impact at Soil estimated at approximately 1,8 million €. Our pilot shows that most non-organic products tend to have a negative impact on soil while organic products show a positive impact and therefore help increasingly to reduce soil erosion. We expect this difference to be considerably larger when soil fertility is taken into account in further work.

3.1.1 Livelihoods impact in more detail

Besides their shareholders, a variety of other stakeholders benefit from Eosta's economic activities, such as their employees and the Dutch government. The figure below presents a more detailed view of the economic value creation and distribution of Eosta in 2015.

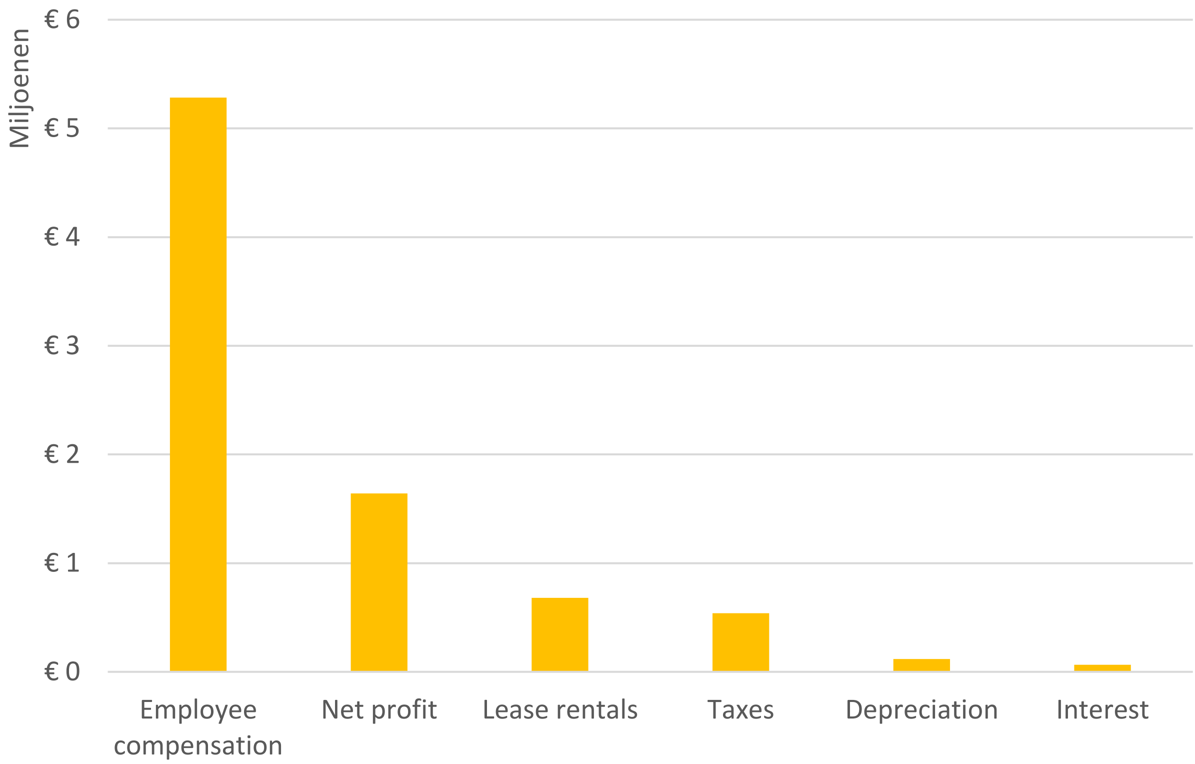


Figure 2 - Livelihoods impact breakdown

The values in the figure above, account only for the economic value creation in the Netherlands as reported by Eosta in their annual report. Therefore, they do not capture the economic impact created upstream of the company (farm level).

3.1.2 Division of impact to Climate

The climate impact was assessed by calculating the carbon footprint of the various products from field to ex-EOSTA level. The GHG protocol was used as a reference guideline. The farm level emissions including soil emissions and carbon sequestration where applicable was modelled using the Cool Farm Tool.

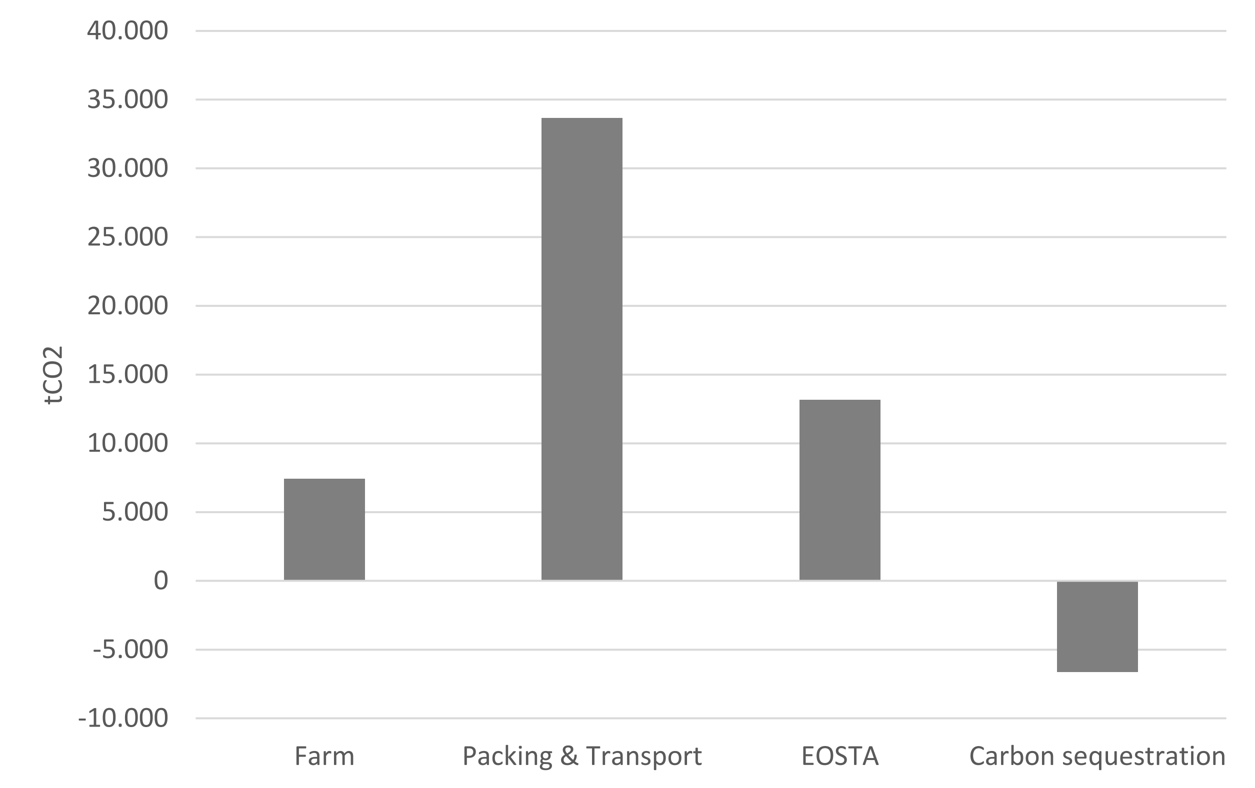


Figure 3 - CO_2e emissions of products in scope over Eosta's supply chain

At farming level, the following emission sources were taken into consideration:

- Fertilizer
- Field energy
- Soil quality/characteristics and management
- Biomass management

At packing & transport level, the following emission sources were taken into consideration:

- Distance from field to local packhouse and means of transport
- Energy use
- Packaging materials

At Eosta level, the following emission sources were taken into consideration:

- Energy use
- Packaging materials

Carbon sequestration was already covered at farming level.

It should be noted that the packing & transport emissions are for the most part in the country of origin. Overseas transport contributes very little to the total.

3.1.3 Division of impact to Water

The water impact was assessed using the guidelines of the global water footprint network. The actual modelling was done using the FAO's publicly available tools ClimWat and CropWat.

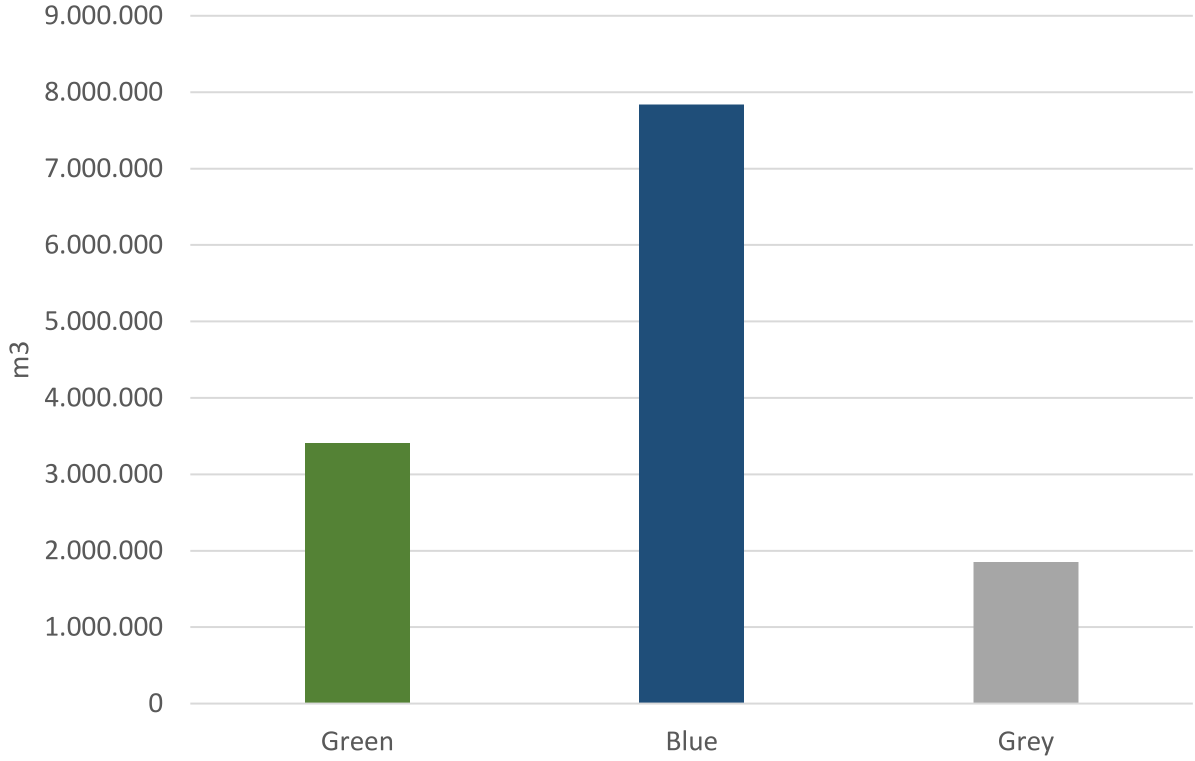


Figure 4 - Green, Blue and Grey water footprint of Eosta's products in scope

The green water footprint presents the consumption of the water, naturally available to the plant such as rainwater stored in the soil. The blue water footprint presents the consumption of water that is provided to the plant through irrigation, taken from surface or ground water reservoirs. To model both the green and blue water footprint, the following parameters are required:

- Basic climatic data such as precipitation, sun hours, wind etc.
- Crop type
- Soil type

The grey water was assessed as well but wasn't monetized due to high level of assumptions.

3.2 Total Value Eosta vs non-organic

In this section we present the Total Value analysis of Eosta for 2015. It is important to note that it is not the ultimate objective of our Total Value analysis to deliver a "lump sum" value for the company itself. Our quantitative analysis of the value creation in the different impact categories is meant to provide insight in their individual magnitude and materiality. Hence, this analysis can provide a fundament to inform decision-making on how these impacts can be influenced.

Caution is needed when adding up the different impact categories as this could oversimplify issues and even blur the overall view. For instance, human rights issues in an organization's supply chain could never be "compensated" by the purchase of CO_2 rights.

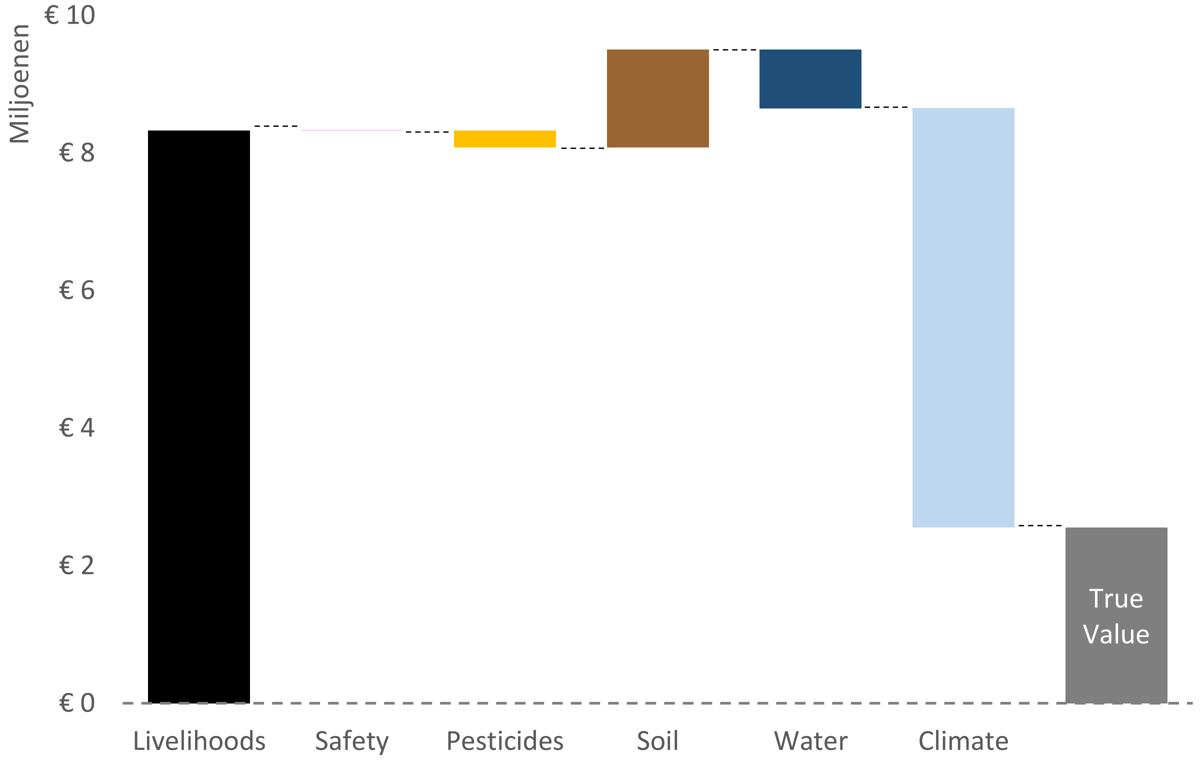


Figure 5 - Total Value of Eosta for 2015 in a waterfall presentation

From the above figure, we see that Eosta creates significant positive value in the Livelihoods and Soil while the largest negative value is created in the Climate and Water categories. Health also shows a small negative impact from pesticide exposure. The negative impact to Safety is rather negligible. Overall, we see that Eosta creates a positive value for the environment, society and itself.

In contrast, Figure 6 presents the estimated Total Value of the non-organic fruits & vegetables trading company.

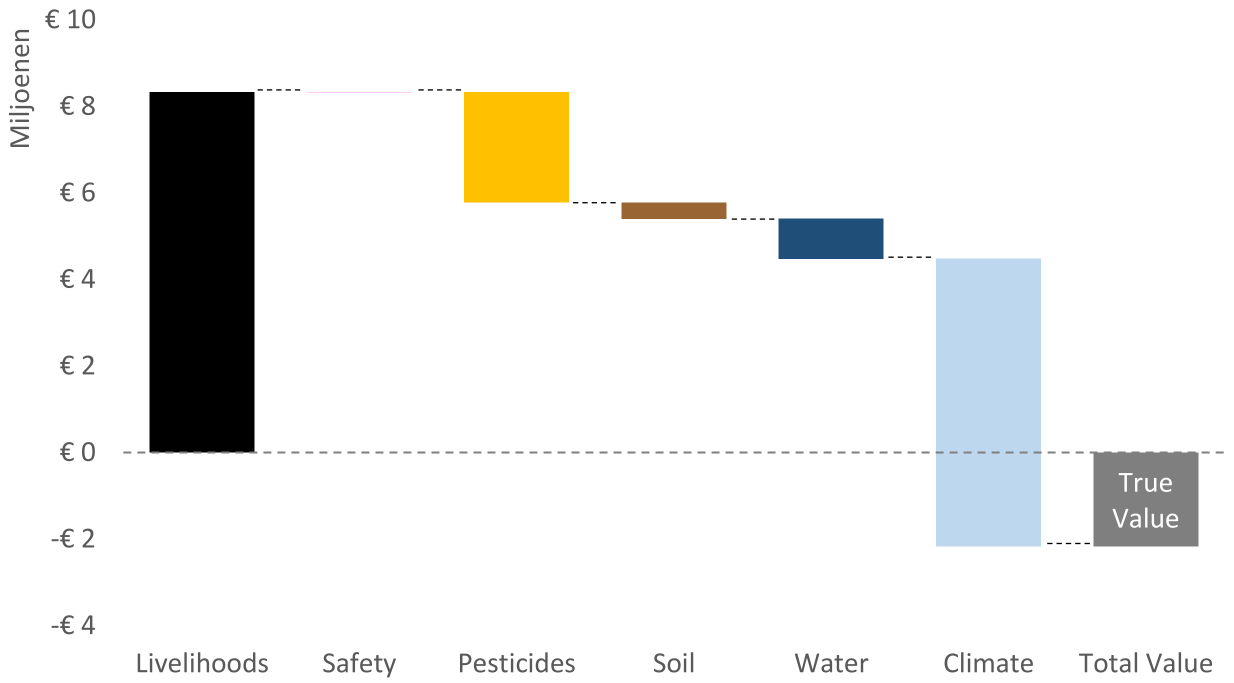


Figure 6 - Waterfall presentation of the Total Value of a non-organic company similar to Eosta

As mentioned, we assume a similar positive impact to Eosta regarding Livelihoods. In all remaining impacts, negative value is created. Especially large, is the impact in Health due to the use of pesticides. Overall, Figure 6 shows that despite the positive impact in Livelihoods, non-organic companies have a negative impact to the environment and society. As mentioned previously, we expect the total impact to be considerably larger when accounting for soil fertility and biodiversity impacts of non-organic products.

3.3 Results Eosta vs non-organic fruits & vegetables

In the following sections, we illustrate the results for the individual products within scope of our pilot. The impacts are presented in € per kg of product. The Safety impact is negligible at kg level and therefore is left out from the graphs.

3.3.1 Apples

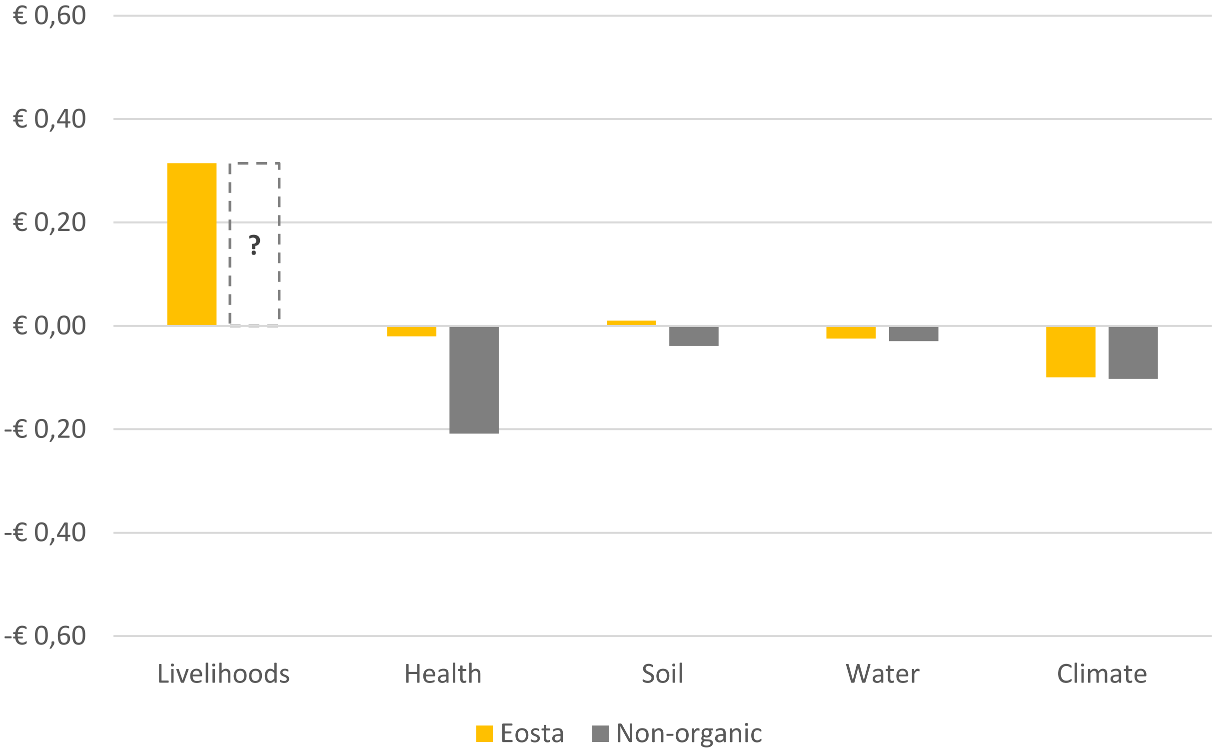


Figure 7 - Apples dashboard

Organic apples are estimated to contribute to Livelihoods with 0,31€/kg.

Additionally, as presented in the figure above the most significant difference in Health (0,19€/kg) comes from apples. This negative impact is almost entirely attributed to the use of pesticides (0,21€/kg for non-organic apples). Out of all products in our scope, apples perform the worst in the Health impact category. This could be explained by the particularity of applying pesticides as close as 5 to 7 days before harvest. These results are in line with the EWG's 2016 Dirty Dozen list[1] where apples scored 2nd worst in terms of pesticide residues.

In Climate, apples show a negligible difference between organic and non-organic. The impact of organic and non-organic was estimated at approximately 0,10€/kg each.

In Water, apples show a difference of 0,01€/kg. The impact of organic and non-organic apples was estimated at 0,02 and 0,03€/kg respectively.

[1] EWG website (2016), Dirty Dozen List: https://www.ewg.org/foodnews/dirty_dozen_list.php

In terms of impact to Soil, the difference between organic and non-organic is calculated at 0,05€/kg. While non-organic apples show a negative impact on soil through soil erosion, organic apples actually reverse the negative effect and create value of 0,01€/kg.

CAMPAIGN IMAGE: Buy organic apples and save 27 sick days*. © Nature & More
(*per hectare and year)

3.3.2 Tomatoes

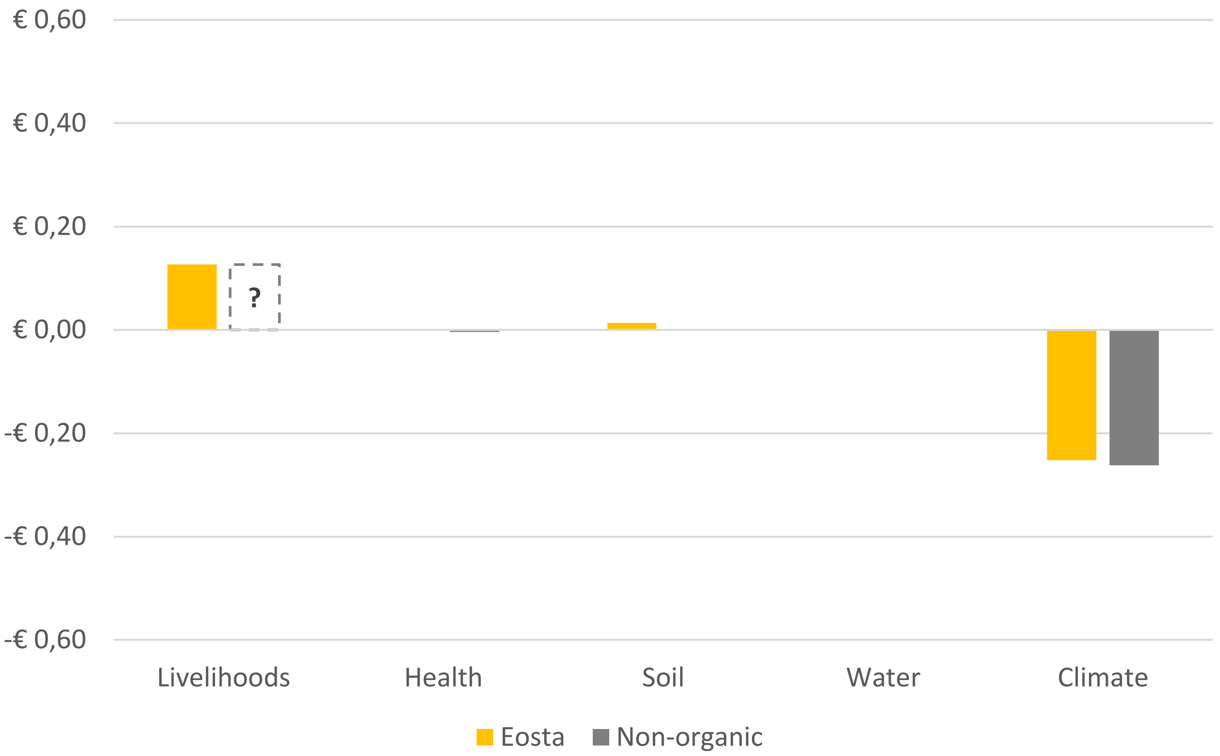


Figure 8 - Tomatoes dashboard

Organic tomatoes were estimated to create around 0,13€/kg positive impact in Livelihoods.

The impact of organic tomatoes to Health is estimated as negligible. Similarly, the difference between organic and non-organic tomatoes is negligible. Due to strict regulations in the Netherlands, use of pesticides is limited and therefore the difference is also limited.

Our results show that tomatoes are significantly CO_2-intensive and the difference in cultivation practices between organic and non-organic is low (0,01€/kg). Organic tomatoes incur a negative impact to 'Climate' of 0,25€/kg while for non-organic tomatoes, this was estimated at 0,26€/kg. These results show that for Climate there is no significant difference, in terms of GHG emissions, between organic and non-organic farming practices.

Additionally, tomatoes have a very small impact to Water and the difference between organic and non-organic is negligible.

In terms of impact to Soil, the non-organic tomatoes were found to have zero impact as they are typically grown on rock wool and therefore there is no impact on soil. However, organic tomatoes were found to have a positive impact of 0,01€/kg. Albeit small, this difference is aligned with the research that shows that growing organic products help prevent soil erosion.

3.3.3 Pineapples

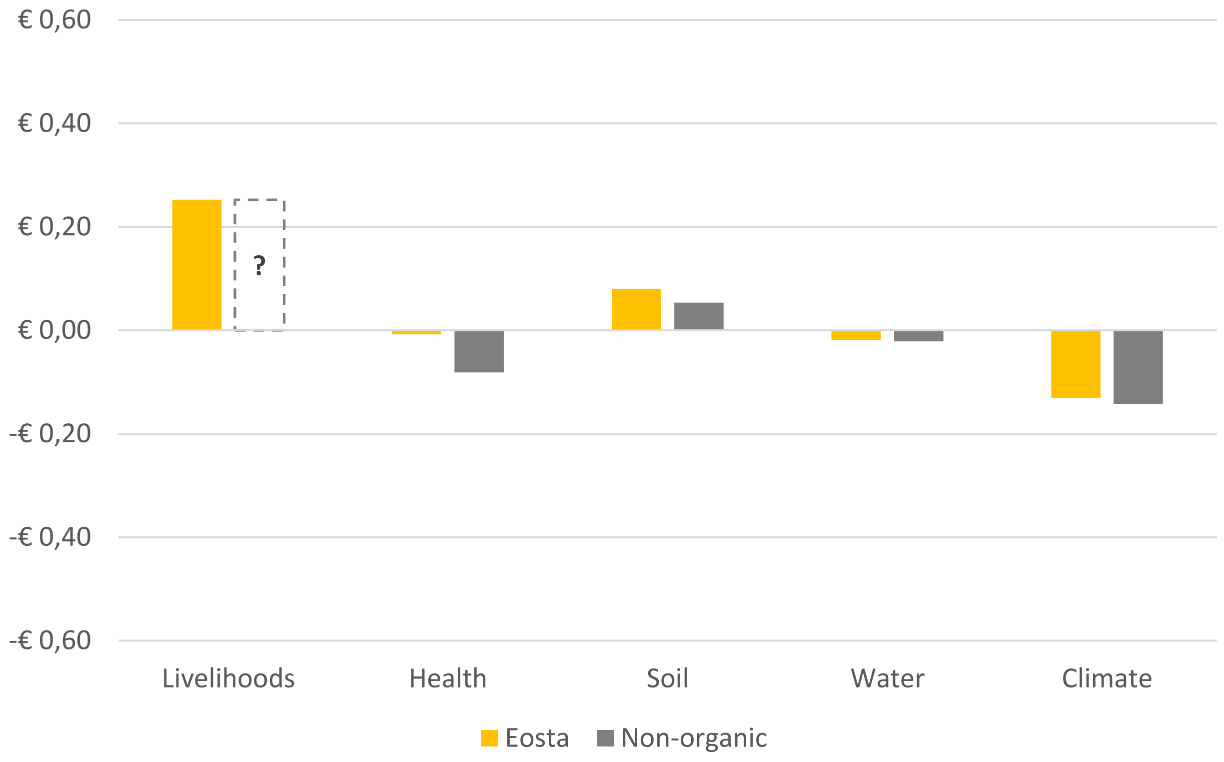


Figure 9 - Pineapples dashboard

In terms of impact on Livelihoods, organic pineapples create around 0,25€/kg of value.

In Health, the difference between organic and non-organic pineapples is estimated at 0,07€/kg. Organic pineapples impact to consumer health is estimated at 0,01€/kg.

In Climate, pineapples show a small difference between organic and non-organic, 0,01€/kg. Both score notably high in terms of CO_2e emissions, at 0,13 and 0,14€/kg respectively.

The difference between organic and non-organic pineapples in terms of Water can be considered negligible. Both, create a negative impact of approximately 0,02€/kg.

Both organic and non-organic pineapples have a positive impact on soil with a difference of 0,03€/kg. Among all organic products, pineapples show the large positive impact at 0,08€/kg. This can be attributed to the high volume of crop residues incorporated. This may differ significantly from farm to farm but in this case, the crop residues are incorporated and in some cases are even treated with beneficial microbes.

CAMPAIGN IMAGE: Buy one organic pineapple and save 125 liters of greenhouse gasses. © Nature & More

3.3.4 Lemons

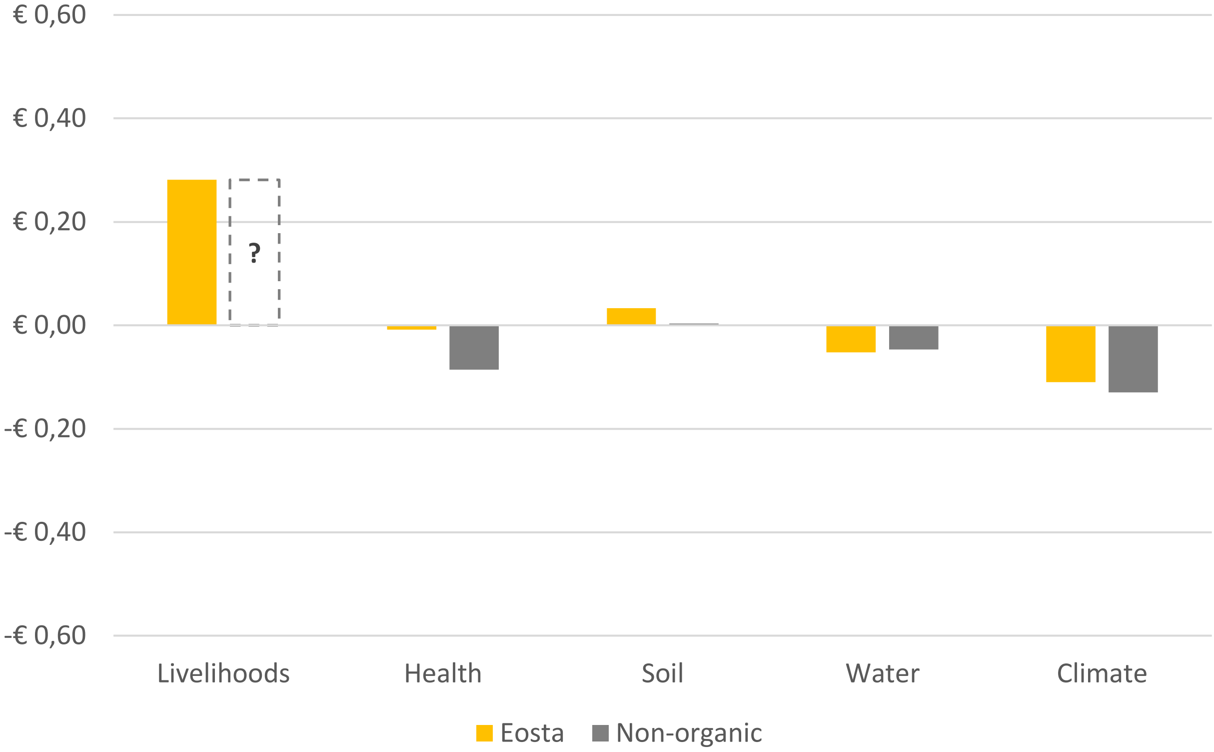


Figure 10 - Lemons dashboard

Organic lemons are estimated to create around 0,28€/kg positive impact in Livelihoods.

The difference between organic and non-organic lemons in Health is estimated at 0,08€/kg with the impact of organic lemons to consumer health at 0,01€/kg.

In Climate, lemons show a difference of 0,02€/kg. The impact of organic and non-organic was estimated at 0,11€/kg and 0,13€/kg respectively.

In Water, organic and non-organic lemons show a negligible difference and both are estimated at approximately 0,05€/kg.

In Soil, the difference between organic and non-organic was calculated at 0,03€/kg with the impact of non-organic almost at zero.

3.3.5 Oranges

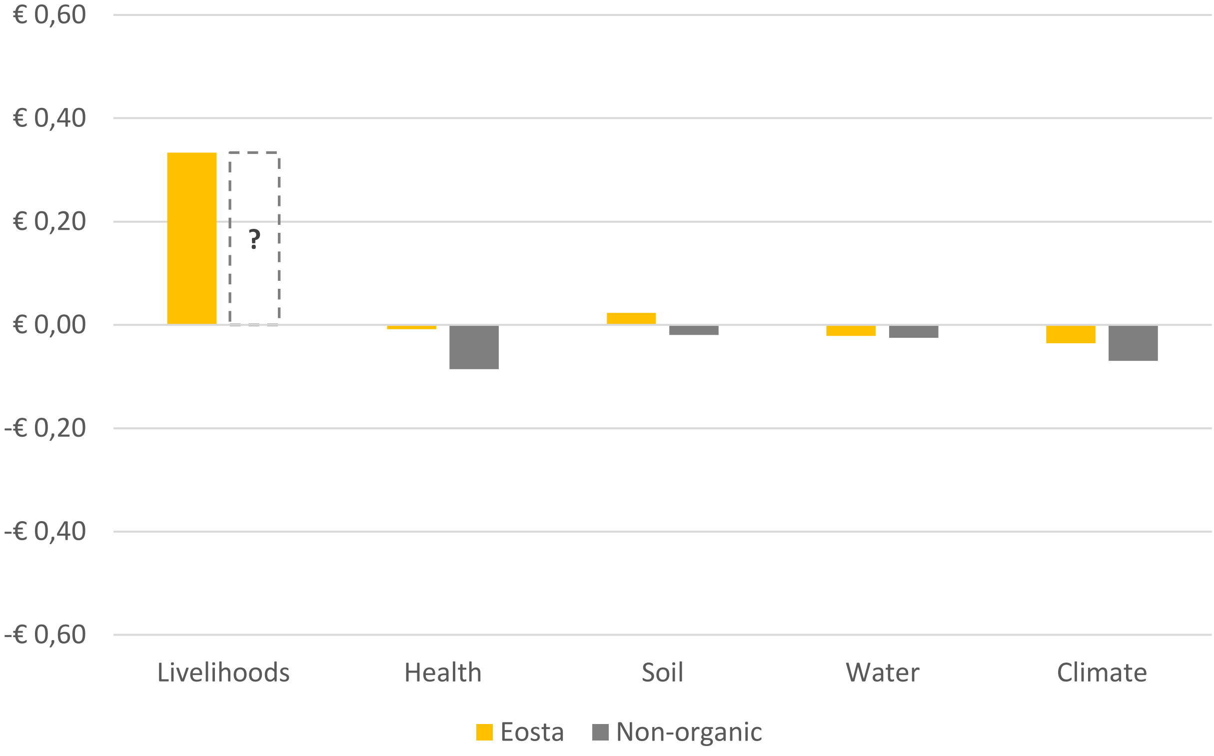


Figure 11 - Oranges dashboard

Organic oranges are estimated to contribute to Livelihoods with value creation of 0,33€/kg.

The difference in Health is estimated at 0,08€/kg with a negative impact of 0,01 and 0,09€/kg for organic and non-organic oranges respectively.

In Climate, oranges show a difference of 0,03€/kg between organic and non-organic. Their impact is estimated at 0,04 and 0,07€/kg respectively.

In Water, oranges show a negligible difference. Both are estimated at 0,02€/kg.

In terms of impact to Soil, the difference between organic and non-organic is calculated at 0,04€/kg. Non-organic oranges show a negative impact of 0,02€/kg while organic apples have a positive impact of 0,02€/kg.

3.3.6 Pears

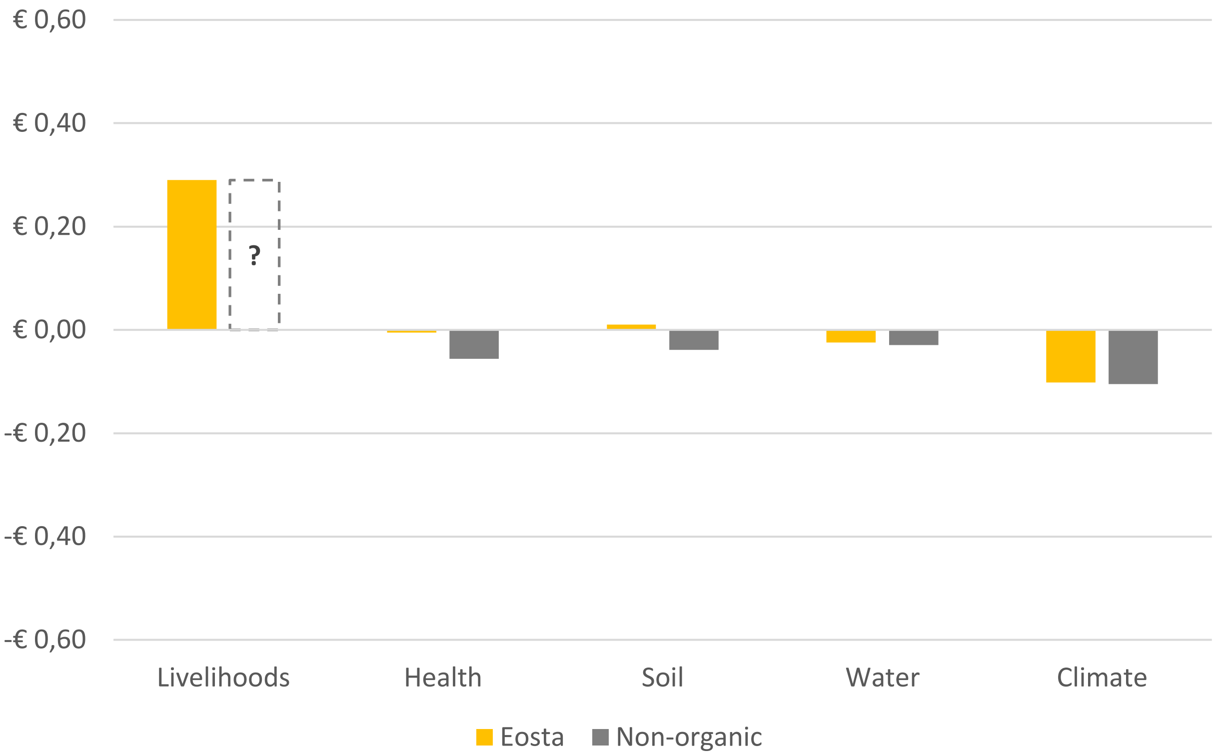


Figure 12 - Pears dashboard

Organic pears are estimated to contribute to Livelihoods with value creation of 0,29€/kg.

The difference in Health is estimated at 0,05€/kg with a negative impact of 0,01 and 0,06€/kg for organic and non-organic pears respectively.

In Climate, organic and non-organic pears show a negligible difference. Both are estimated at 0,10€/kg.

Also in Water, pears show a negligible difference. Both are estimated at approximately 0,03€/kg.

In Soil, the difference between organic and non-organic pears is calculated at 0,05€/kg with non-organic pears showing a negative impact of 0,04€/kg while organic apples have a positive impact of 0,01€/kg.

CAMPAIGN IMAGE: Buy organic pears and save 6m³ of fertile soil*. © Nature & More
(* per 1000 sqm and year)

3.3.7 Avocados

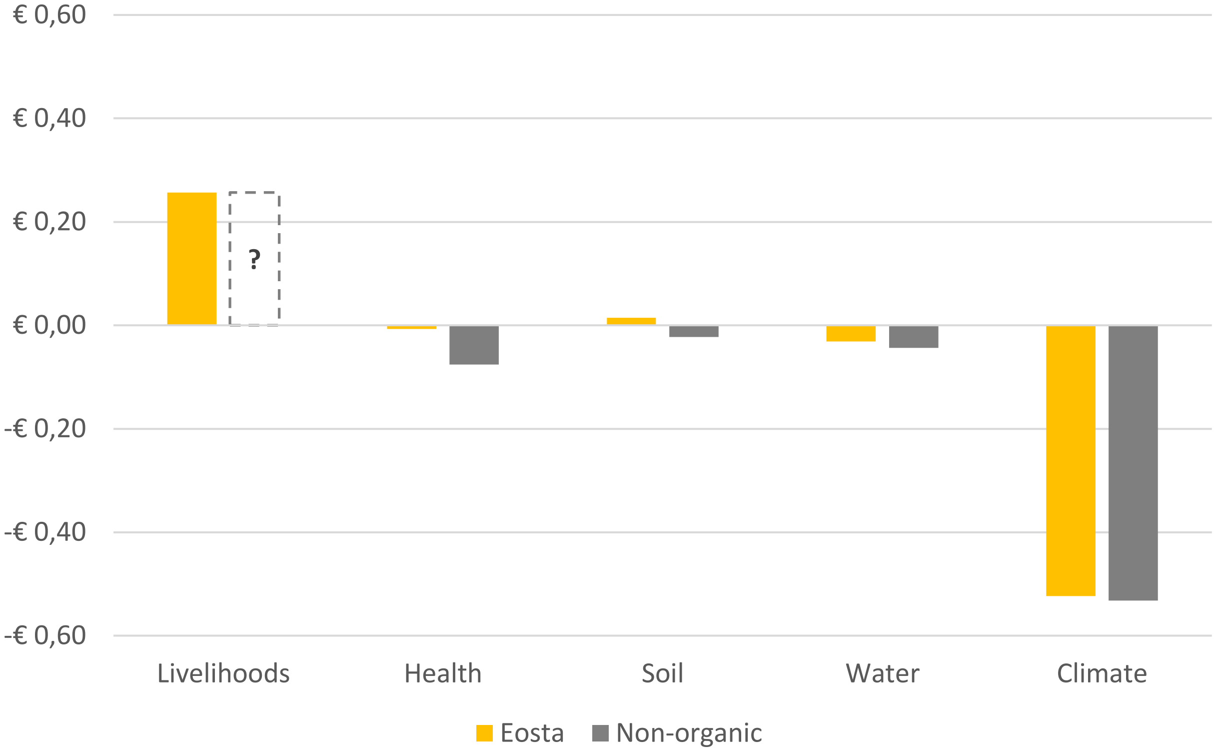


Figure 13 - Avocados dashboard

Organic avocados are estimated to create around 0,26€/kg positive impact in Livelihoods.

The difference between organic and non-organic avocados in Health is estimated at 0,07€/kg. The impact of organic avocados is estimated at minus 0,01€/kg and non-organic avocados at 0,08€/kg.

In Climate, avocados show a difference of 0,01€/kg. The impact of non-organic avocados is larger than the impact of organic at 0,53 and 0,52€/kg respectively.

In Water, organic and non-organic avocados show a difference of 0,01€/kg, estimated at minus 0,03 and 0,04€/kg respectively.

In Soil, a difference of 0,04€/kg in impact can be observed. Organic avocados show a positive impact of 0,02€/kg while non-organic avocados show an impact of minus 0,02€/kg.

3.3.8 Grapes

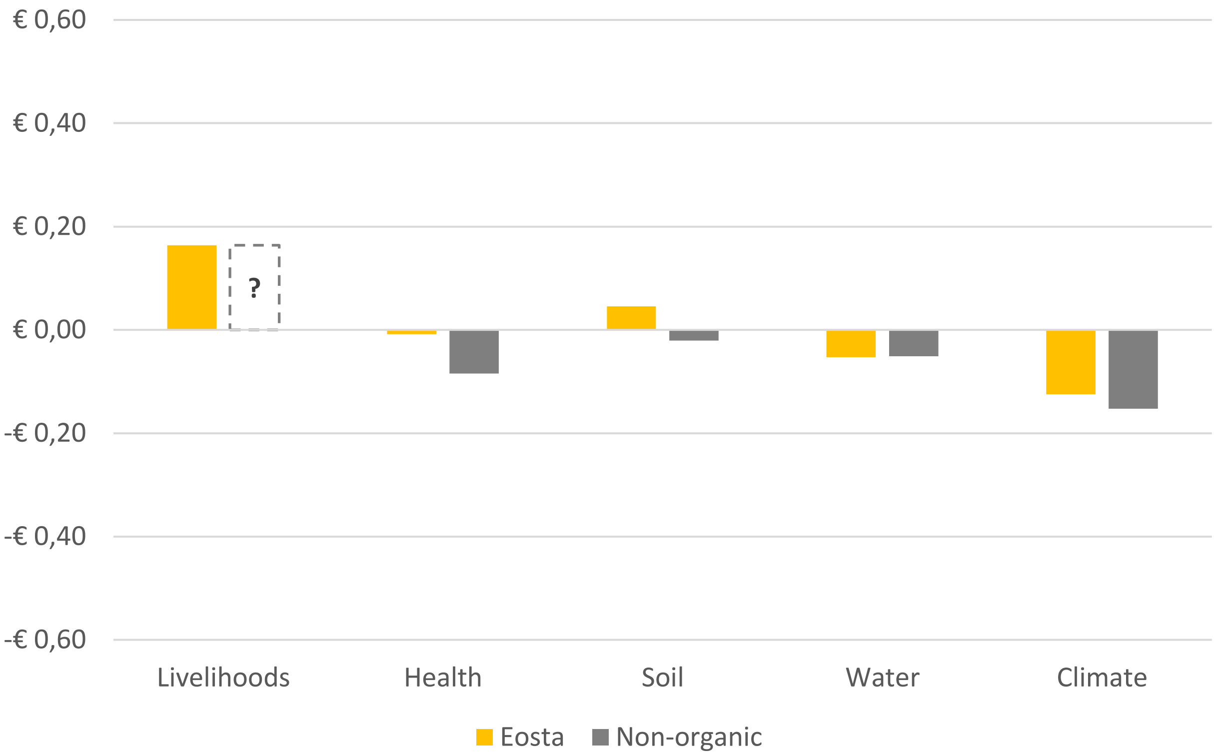


Figure 14 - Grapes dashboard

The contribution of organic grapes to Livelihoods is estimated at 0,16€/kg.

The difference in Health is estimated at 0,08€/kg with a negative impact of 0,01 and approximately 0,09€/kg for organic and non-organic grapes respectively.

In Climate, a difference of 0,03€/kg is observed. Organic grapes are estimated at 0,12€/kg and non-organic at 0,15€/kg.

In Water, grapes show a negligible difference and are estimated at approximately 0,05€/kg each.

In Soil, the difference between organic and non-organic grapes is calculated at 0,07€/kg with non-organic grapes showing a negative impact of 0,02€/kg while organic apples have a positive impact of 0,05€/kg.

CAMPAIGN IMAGE: Buy organic grapes and save 14.708 liters* of water. © Nature & More
(* per 100 sqm and year)

3.3.9 Carrots

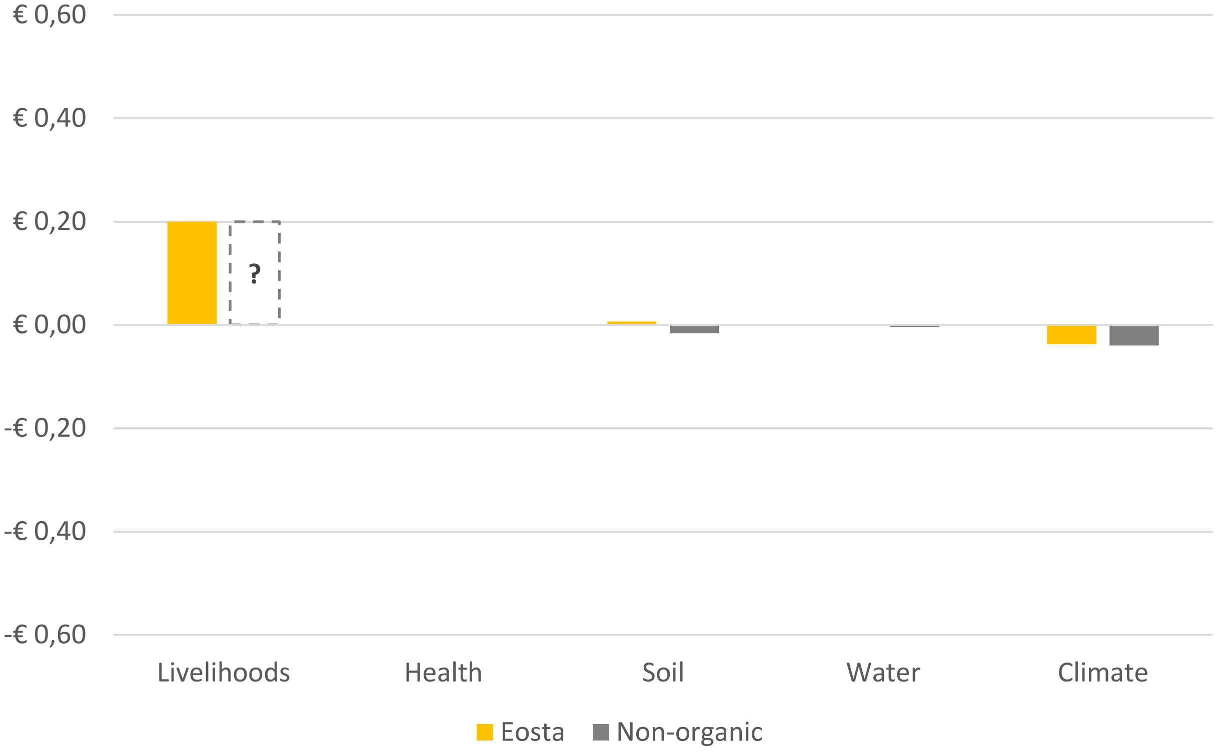


Figure 15 - Carrots dashboard

The contribution of organic carrots to Livelihoods is estimated at 0,20€/kg.

The difference in Health is negligible. For both organic and non-organic it is estimated at zero.

In Climate, the difference is negligible. Both organic and non-organic carrots are estimated at 0,04€/kg.

The impact of organic and non-organic carrots in Water is negligible for both.

In Soil, the difference between organic and non-organic grapes is calculated at approximately 0,01€/kg with non-organic carrots showing a negative impact of 0,02€/kg while organic apples have a positive impact of 0,01€/kg.

4 Methodology

4.1 Livelihoods

4.1.1 Economic capital

The aim of the economic impact assessment is to provide insight into and quantify the economic value creation along Eosta's value chain as well as for its products. To calculate this impact we use the Gross Value Added (GVA) concept. GVA has been defined in the System of National Accounts 2008 (SNA 2008) and adopted by the United Nations Statistical Commission (UNSC). Generally, GVA can be expressed as the value of produced goods and services minus the value of intermediate consumption. This value can be calculated for any company or link in a value chain (producer, trader, etc.).

As a first step and due to lack of extensive data, we use this methodology to provide an evaluation of economic value creation at company level only. Thereby, for this pilot, we do not take into account the economic value created upstream of Eosta's value chain (i.e. at farm level). In our analysis we include the following elements:

Elements of economic impact assessment	Contribution to
Gross compensation of employees	Employees
Taxes paid	Government
Lease rentals	Owners of fixed capital goods
Interest	Providers of financial assets (banks, etc.)
Depreciation	Suppliers of fixed assets
Net Profit	Shareholders

Table 2 - Economic impact elements and their contribution to stakeholders, adapted from Ecomatters (2016)

As illustrated in Table 2, the GVA approach helps represent the economic value creation benefiting all stakeholders of Eosta instead of showing the value created for shareholders only. Due to lack of data we do not estimate the economic impact of non-organic companies. Further work with suitable data, could allow for this impact to be incorporated in the analysis.

Furthermore, in our pilot we calculate the economic impact per kg product sold by Eosta in 2015. To distribute the economic impact over the different products we use the gross margin of each product as a weighting set. It should be noted, that the entire economic impact, and not just profit, is allocated to each product. The main assumption here is that profit is crucial for a company to create the additional forms of GVA, such as employee compensation and taxes, for all its stakeholders. Similar to the economic impact at company level, we do not have information on the economic impact of non-organic products. In further work, this could also be incorporated in the analysis.

4.2 Safety

4.2.1 Worker Safety

Typically, the impact of a product or service is estimated and presented together under the label 'Worker Health & Safety' (H&S). In this pilot, we follow a slightly adapted approach that allows us to estimate and present the results in a more granular way. We therefore, distinguish the Worker H&S impact to two impacts, namely Worker Health and Worker Safety. The former, we define as the impact to the farm workers' health by the use of pesticides and/or the lack of proper protective equipment. The latter, we define as the impact to farm workers' health occurring from physical accidents and injuries related to their line of work.

Occupational exposure to pesticides poses a significant health risk for farm workers and has been shown to be responsible for chemical-related injuries as well as short- and long-term illnesses. Due to lack of data regarding worker pesticide exposure we focus our assessment on the Worker Safety impact only.

To estimate this impact we calculate the average minor injuries per farm type, organic vs non-organic, based on data from the Sustainability Flower. We estimate minor injuries as those injuries that result in a worker's absence from work for a maximum of 3 days. Absence from work for more than 3 days is considered a major injury. From the available dataset, we are not able to derive a major injury value therefore we focus only on minor injuries. Our results are in line with expert opinion where organic farms tend to be more work-intensive than non-organic and therefore the risk of injury of workers tend to be higher.

Due to lack of consistent data for each product in scope for both organic and non-organic produce we further assume that the injury rates apply irrespective of the type of product and country of origin. Therefore, we make no distinction between injuries incurred, for example, at Apple vs Carrot farms where production processes are different. These conditions could have a significant impact on the production processes and subsequently in our estimation of this impact.

Using the above approximations we calculate the amount of productive years lost due to injuries which we then monetize using the average salary of farm workers. We then distribute the monetized impact over the total kg of produce for both organic and non-organic and finally allocate the impact to Eosta based on the percentage of the harvest purchased from the individual suppliers.

4.3 Health

4.3.1 Pesticide exposure

The underlying aim of this part of the pilot is to initiate consumer health impact calculations of pesticide ingestion for inclusion in true cost accounting of products. The goal is to monetize the negative human health impacts of pesticide residues for general non-organic produce, general organic produce and Eosta produce.

First, an assessment of general non-organic produce is attempted to identify the baseline scenario, assuming that most produce is produced using non-organic methods, i.e. synthetic pesticides. For this, several different sources, models and assumptions were combined to arrive at a first estimate. The main sources, databases, models and assumptions of our approach are reported below:

- The EcoInvent database (Frischknecht et al., 2005) contains pesticide application data for most of the produce in scope of the pilot.
- The different types of pesticides encountered on non-organic produce are identified using the 2014-2016 European Food Safety Authority (EFSA) reports on pesticide residues, for as many of the products in scope as possible.
- The health impacts of the most encountered pesticides are matched using data from the study of Fantke & Jolliet (2016). In their study, the authors estimated the Disability Adjusted Life Years (DALYs) per kg pesticide applied for approximately 875 pesticides. The 10 most encountered pesticide residues which have information on their health impacts are included in our analysis.
- It was beyond the scope of this pilot to include the exact amounts for all pesticides used for the different crops and in the different countries of origin. Therefore, the 10 most encountered pesticides are assumed to be applied in similar quantities resulting in an average value. More crop- and country-specific information could be included in a later stage, when pesticide application regulations for each country are integrated and all encountered pesticides are taken into account in their respective application quantity. This assumption could lead to a significant overestimation of the calculated health impacts, a limitation that we discuss in the following chapter.
- The DALYs/kg produce are subsequently derived by multiplying the amount of pesticides applied with the average DALY/kg of the pesticides most encountered.
- Based on CE Delft (2005), the societal cost of a DALY is determined at € 77.000€.
- Combining the available data from the above sources the pesticide impacts to consumer health are estimated for the following products: Apples, Tomatoes, Pineapples, Lemons, Oranges, Pears, Grapes and Carrots. For Pineapples no data was available from EFSA on the pesticide types encountered, therefore data from the U.S. Department of Agriculture (USDA) as presented on the What's On My Food website are used to obtain a first estimate. For Avocados, only one pesticide was available in the What's On My Food database but no other data regarding application amounts and the related health impacts. Therefore, we assume an average pesticide impact based on the results we generate for the other products in scope.
- We find the calculation for Apples and Tomatoes as the most reliable, since health impacts are quantified for these products in the Fantke & Jolliet report specifically regarding application time and crop type. For the remaining products in scope, we make an assumption due to lack of product-specific data in the Fantke & Jolliet report. For fruits the Apple data are used as a proxy, while for Carrots the data of Potatoes are used as a proxy.
- The baseline is then extrapolated to an organic produce scenario, using the EFSA report (2015) on pesticide residues since it also reports the encountered pesticides on organic produce both below and above the Maximum Residue Limit (MRL). The ratio of the % of samples above the MRL encountered on organic produce divided over the % of samples above the MRL encountered on non-organic produce is applied to estimate the amount of pesticide residue on organic produce encountered by the EFSA (0,8%/2,6% = 30,77%). This leads to a reduction of 69,23% for the pesticide amounts for organic produce. The ratio is applied similarly for all products in scope to obtain estimates for pesticide residues on organic produce. It is important to note that even if organic produce is not treated with synthetic pesticides, it still can be contaminated by neighboring farms using conventional methods or via lingering pesticides in soil, groundwater, etc. Therefore, we follow a more precautionary approach by using an estimated health impact based on 30,77% of conventional impacts based on EFSA 2015 where the percentage of samples above the MRL for both organic and conventional produce is reported.

- Finally, a company specific estimate is derived based on primary data on encountered pesticide residues. Eosta reports pesticides encountered in 0,28% of specimens tested, the calculated approximate reduction of pesticides impacts for Eosta produce is therefore 89,23%.

Following the approach outlined above, the societal costs of pesticide residue for different production systems are shown in Figure 16.

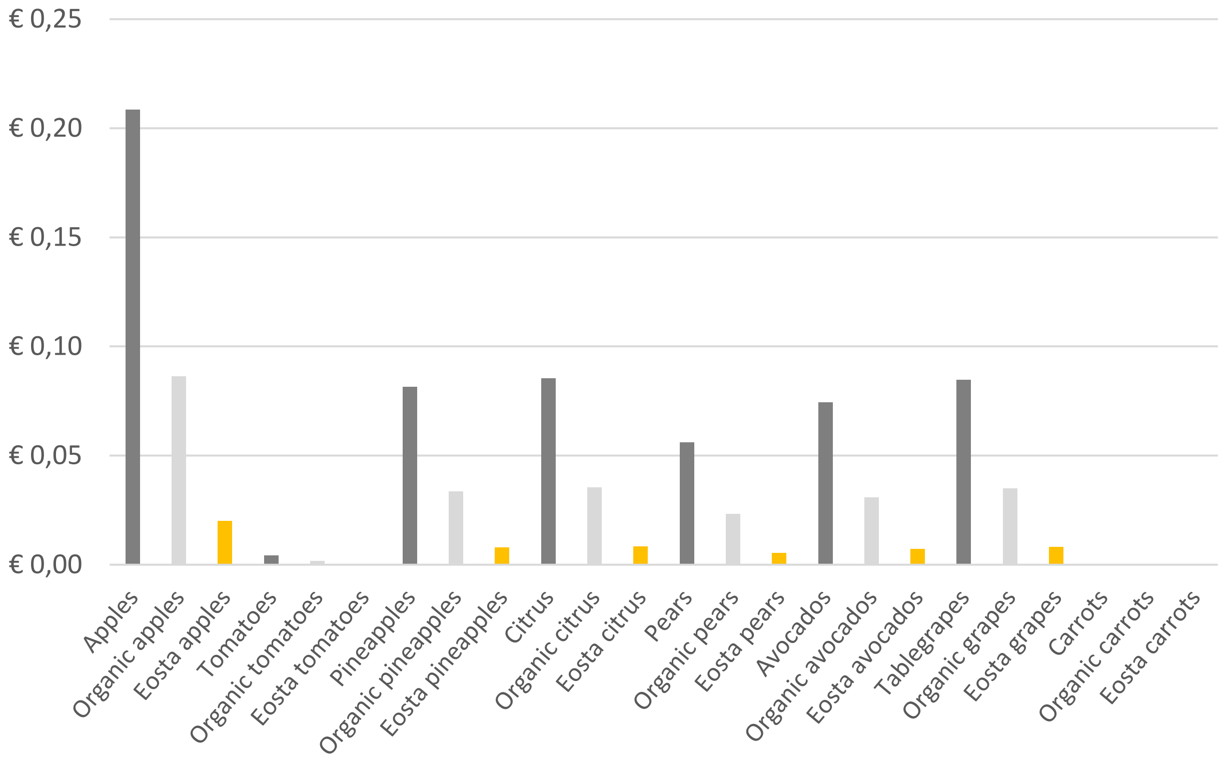


Figure 16 - Estimation of pesticide impact to consumer health for different production systems

The results are depicted as 3 different scenarios: 2 generic scenarios for conventional and organic produce, as well as a company-specific scenario for Eosta.

4.4 Climate

The carbon footprint assessment is calculated in compliance with the guidelines of the Greenhouse Gas Protocol (GHGP) as developed by the World Business Council for Sustainable Development and includes Scope 1, 2 and 3 emissions. The soil emissions and carbon removals are modelled using the Cool Farm Tool[2] (CFT). The CFT is a carbon footprint calculator, mainly applicable to farming level which was jointly developed by food and agricultural industry and science. The CFT takes into consideration soil characteristics, fertilization practices, pest and disease control, energy use as well as general practices such as soil preparation, crop rotation and crop residue incorporation. The output unit of this carbon footprint is kgCO_2e/kg product. CO_2"e" means that all relevant greenhouse gases are considered including CO_2, CH_4 and NO_2. The main aspects of the GHGP are defined in the following paragraphs.

The carbon footprint includes the greenhouse gas emissions that are released during different supply-chain stages. For every production stage the inputs and outputs are inventoried. The following stages in the life cycle of the assessed products are included in our pilot:

- Stage 1: Farming
  - Energy consumption: diesel for tractors and other equipment
  - Soil emissions and carbon sequestration
  - Fertilization and pest and disease control
  - Crop residue management
  - Transport to next stage if applicable
- Stage 2: Local sorting and packing
  - Energy consumption: electricity and diesel/petrol use
  - Packaging materials and transport to next stage
- Stage 3: Final sorting and packing
  - Energy consumption: electricity and diesel/petrol use
  - Packaging materials and transport to next stage, incl. retail packaging

In line with the requirements of the GHGP, the emissions identified within the system boundary and the different stages are assigned to three different scopes as follows:

- **Scope 1**: Scope 1 emissions include the direct GHG emissions of a company. These emissions arise from sources that are owned or controlled by the company, e.g. a diesel powered generator on the company's premises.
- **Scope 2**: Scope 2 emissions include indirect GHG emissions of the product. These are emissions from the generation of purchased electricity consumed by the company. Purchased electricity is defined as electricity that is purchased or otherwise brought into the organizational boundary of the company. Scope 2 emissions physically occur at the facility where electricity is generated.
- **Scope 3**: Scope 3 emissions include other indirect GHG emissions of the company. These emissions are a consequence of the activities of the company but occur at sources owned or controlled by another company.

[2] https://coolfarmtool.org/

4.5 Water

The water footprint assessment is calculated in compliance with the guidelines of the Global Water Footprint Network. The green, blue and grey water footprint are assessed individually. The green and blue water footprint is modelled using CropWat[3] and ClimWat[4] which take into consideration the local climate conditions as well as soil and crop type. The grey water footprint is calculated using the Drinking Water Quality Standard as a reference the recommended generic leakage factors. Due the accuracy of the available data and following a conservative approach, the grey water footprint is not included in the final valuation of the externalities.

A full water footprint assessment consists of four distinct phases:

1. setting goals and scope
2. water footprint accounting
3. water footprint sustainability assessment
4. water footprint response formulation

As this is the first study of its kind, this assessment focuses on the first two phases of the water footprint assessment and partly on the water footprint sustainability assessment as part of the hotspot analysis. For completeness purposes this study includes all three types of the water footprint although the grey water footprint wasn't monetized due to high level of assumptions and "virtuality".

- The blue water footprint that presents the consumption of blue water resources (surface and ground water) along the supply chain of a product
- The green water footprint that presents the consumption of green water resources (rainwater stored in the soil as soil moisture)
- The grey water footprint that is defined as the volume of freshwater that is required to assimilate the load of pollutants based on existing ambient water quality standards

As the grey water footprint is to a certain extend only of "virtual" nature, it does not have to be communicated but reduction measures should be taken into consideration. The following sources of water consumption are not included in this study:

- The water footprint due to production of electricity and fuels consumed (including fuels needed for transportation).
- Water embedded in the product (since it is a very small part of the total footprint).
- The water footprint of input materials (package material, fertilizers, etc.). This is due to the fact that data needed to calculate the water footprint of different packaging materials, as well as other input materials are still not available. Also, the water footprint of those input materials is expected to present a minor part of the total water footprint.
- The water footprint of capital goods (like trucks, buildings, equipment, etc.).

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[3] http://www.fao.org/nr/water/infores_databases_cropwat.html

[4] http://www.fao.org/nr/water/infores_databases_climwat.html

4.6 Soil

To assess the erosion risk of intensive agricultural systems, SMI used the Revised Universal Soil Loss Equation.

The Revised Universal Soil Loss Equation (RUSLE) is an erosion model, developed in the US government. It is widely used to estimate rates of soil erosion. RUSLE is used by government agencies around the world to assess and inventory erosion to assist public policy development. Government agencies use RUSLE as regulatory and conservation planning tools, to select erosion control plans and to ensure cost effective, environmental protection. RUSLE is land use independent and can be used on cropland, disturbed forestland, rangeland, construction sites, mined land, reclaimed land and others.

Amongst others, RUSLE takes into consideration the following parameters:

- Duration of the crop cycle
- Slope of your farm
- Tillage practices
- Orientation of the soil preparation
- Duration of fallow period

The output of RUSLE is tons of eroded topsoil per hectare. This value was factored with the yield per hectare and the FAO monetization factor in order to get the external costs related to erosion per kg of product.

There is no unique software to use RUSLE, therefore the assessment was done manually in Excel.

In order to quantify soil build-up, the carbon sequestration rate derived from the Cool Farm Tool modelling was taken as a basis. Provided the farming system returns crop residues or other biomass to the soil, the sequestered carbon was converted into soil organic matter and extrapolated to one hectare. Factoring this with the yield per hectare and the FAO monetization factor, the external costs related to soil build-up per kg of product was created.

4.7 Biodiversity

As stated previously in the scope section of this report, Biodiversity is not taken into account in this pilot due to the lack of time and resources. However, we are planning on developing a suitable methodology for further assessment (see Chapter 5 for next steps).

5 Learnings & next steps

5.1 Learnings

In line with our goal, this pilot helps generate knowledge on the strengths and limitations of True Cost Accounting in the Finance, Food & Farming sector. Considering the impacts in scope, the results illustrate the positive benefits of producing and consuming organic fruits and vegetables. Most importantly, though, this pilot shows how TCA can be used to complement decision-making. Despite these, it is important to acknowledge that we are only in the first part of a long journey, and therefore further work needs to be performed to overcome present limitations. In the following section, we discuss these limitations further.

5.1.1 Data availability

Perhaps the most important limitation of our pilot and also other similar studies is the lack of credible and comparable data for organic and non-organic products at farm level. Often a large amount of data is collected, i.e. the Sustainability Flower, but as such they are not always useful for TCA. It is important that material KPI's are determined so that fit-for-purpose can be collected. This would then help reduce the amount of data collected and also allow for the development of a concrete and harmonized approach of TCA in FFF.

5.1.2 Economic capital

The main limitation in our economic capital approach relates to data availability upstream of Eosta in the value chain (farm level). We are only, thereby, able to estimate the economic impact at company level. A next step, would be to gather additional data from the farmers that would then allow us to estimate the economic impact using the same GVA methodology.

5.1.3 Safety

A limitation of our approach is that production and harvest of some products might be more injury-intensive compared to other products. This could lead to a potential over- or underestimation of the Worker Safety impact. In further work, additional data are required to enable this distinction.

5.1.4 Pesticide exposure

An important limitation is that the health impacts of consumption of pesticide residues currently is likely to be an over-estimation. This is primarily caused by lack of specific data on pesticide use, application amounts and time of application before harvest. Currently the 10 most encountered pesticides are taken into account, where the application amount is assumed to be equal for these pesticides. Where it is almost certain that the amounts of pesticides applied differ severely: the more toxic, the smaller the amount applied (usually).
It is imperative that from now on high-quality, verifiable and pragmatic data is collected from both Eosta suppliers as well as non-organic suppliers on their pest control systems. Although the Sustainability Flower does touch this subject, this needs to be elaborated much further.

Moreover in the current approach we had to use either proxies or averages to estimate the health impacts of products where data was missing: The data provided in Fantke & Jolliet (2016) only matches tomatoes and apples in the scope of this pilot. In further work, the modelling of the health impact for the different products is to be specified per crop to obtain more reliable estimates.

Additionally, while synthetic pesticides are not applied with organic methods, organic pesticides are currently not included in the analysis. For a fair comparison, the potential human (and environmental) impacts of organic pesticides should be quantified as well.

5.1.5 Climate

Currently only the climate change mitigation impact of a farming system is assessed. For future assessments, the adaptation capacity, the resilience of a farming system should be evaluated. This is closely linked to soil where soil fertility should be looked at rather than just erosion. It is the mid- and long-term capacity of a farming system to adapt reasonably perform under a changing climate. This is where organic systems are very likely to outperform business as usual systems.

5.1.6 Water

For future assessment, water scarcity should be included in the assessment as some of the products looked at originate from water scare areas. In addition, water pollution, grey water need to be looked at again. Due to the high level of assumptions and "virtuality" the grey water impact wasn't monetized in this assessment but there is a real impact linked to grey water and a solid, conservative approach should be developed.

5.1.7 Soil

The soil assessment has to be developed beyond erosion. As mentioned above under climate, the longer term impact of soil fertility should be looked at. This is where the true benefit of an organic system comes is as the overall resilience of an organic farming system is higher due to crop rotation, crop residue recycling etc.

5.2 Next steps

5.2.1 Scope expansion

As this assessment is a pilot the scope was limited to the most material impacts, see figure below:

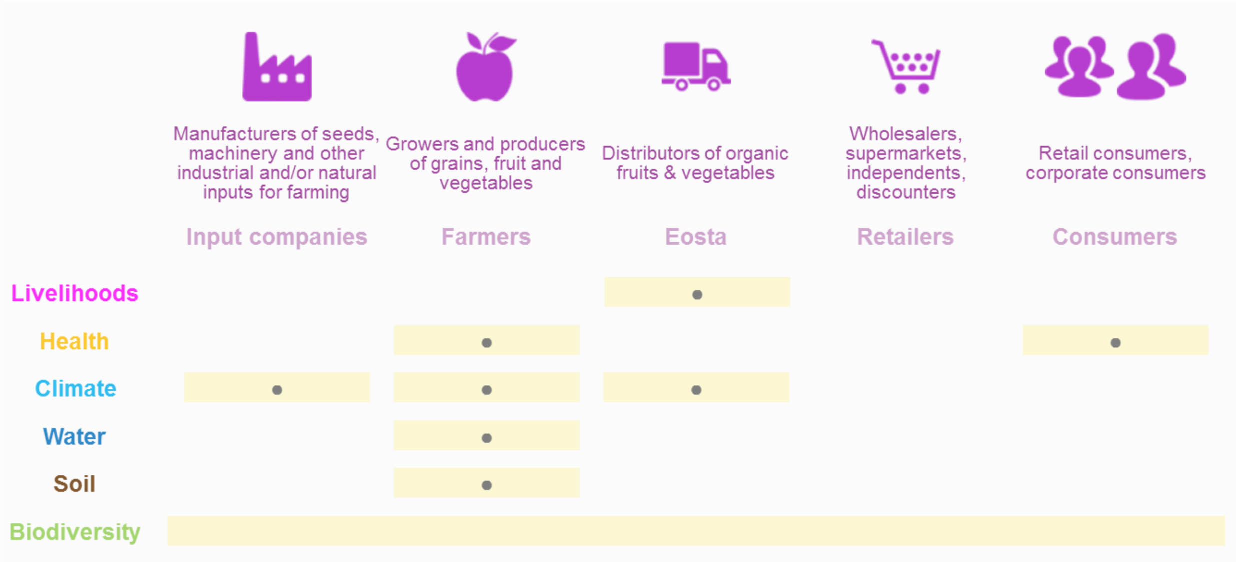

Figure 17- Current scope of our pilot

To help complete the picture of fruits and vegetables and their impact to a sustainable planet it is important to expand this scope. Future work shall include more impacts of interest for both environmental and social aspects according to the elements of the Sustainability Flower.

The following table, presents our idea on what this expanded scope should look like. Impacts in blue are impacts that are currently included in our pilot. Impacts in red are not included in our pilot but could be interesting to assess in further work.

Elements of the Sustainability Flower	Impacts
Livelihoods	Economic capital Participatory employment Skills & Education Fair wages ...
Health	Worker Safety (workers' physical accidents/injuries) Pesticides (direct exposure of consumers through ingestion) Worker Health (workers' exposure to pesticides) Indirect exposure of society to Pesticides ...
Climate	GHG emissions Ammonia emissions ...
Water	Water use Water quality (N, P, Nitrate and Pesticides) Water scarcity Acidification ...

Soil	Soil erosion (wind & water) Soil fertility Eutrophication ...
Biodiversity	Land use change and occupation Biodiversity loss Fresh water Ecotoxiticy Marine Ecotoxiticy ...

Table 3 - Scope expansion

Figure 18 shows our estimation of what the IP&L would look like if we took into account all elements of the Flower as well as additional impacts for each element.

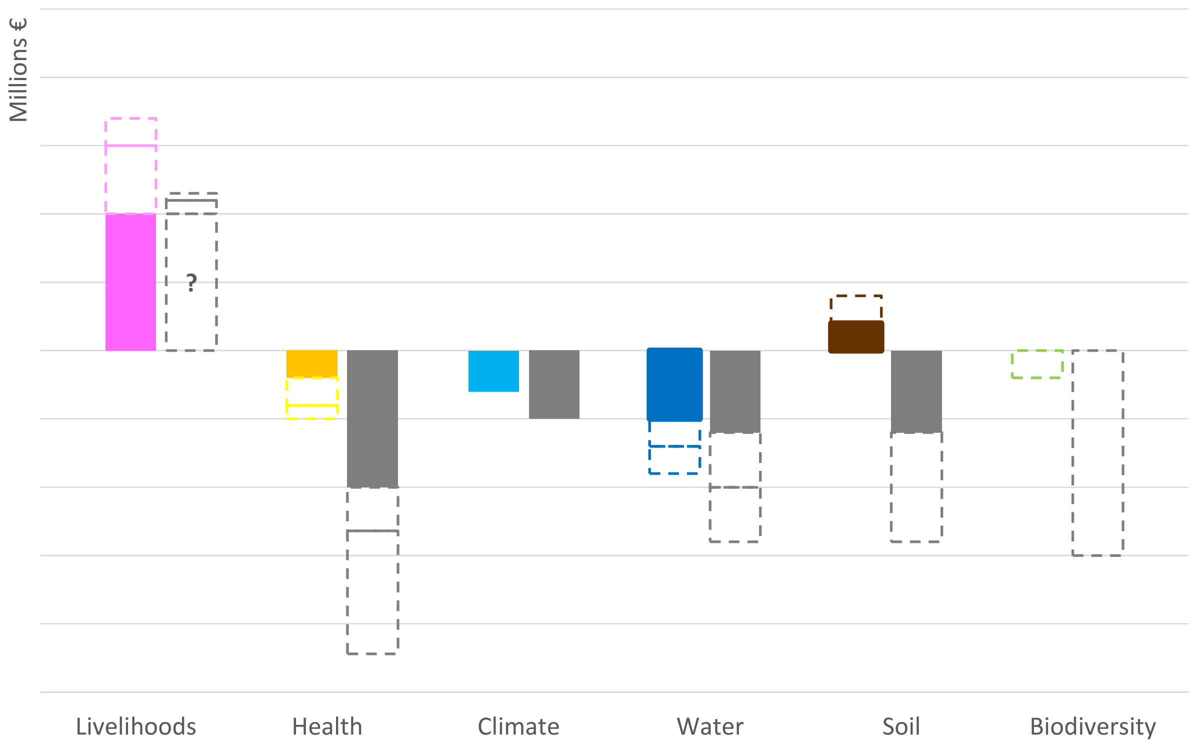

Figure 18 - Eosta vs Non-organic equivalent IP&L account, with extended scope

5.2.2 Depth expansion

Besides expanding the scope in terms of number of impacts, it is important to also dive in deeper to the existing set. A few of the key refinements we have identified are presented below.

5.2.2.1 Pesticides

The current estimations of health impacts of organic and conventional produce are to be seen as the start of a process. Several limitations and assumptions deserve further attention when improving the methodology but also the data collection.

- Include indirect impacts in the calculation = transfer of pesticide residue through environment
- Include organic pesticides in the analysis
- Include specific amounts of pesticides used for each farm, conventional, organic and Eosta
- Further specify Fantke model for each individual type of fruit and veg, including application times etc.
- Include Worker Health impacts in the analysis

5.2.2.2 Ammonia emissions

Darko Znaor commented as follows: "…the biggest hidden costs relates to air pollution (mainly ammonia). That is where organic has the case and heavily beats conventional. Ammonia alone accounts for 68% of the TOTAL environmental damage(= damage to soil, water, air and climate) in case of Wallonia (similar result also for Croatia)." Prior work has shown that the largest costs of conventional product related to air pollution, namely ammonia emissions. In his studies, Darko Znaor has shown in two different cases that ammonia emissions alone account for 68% of the total environmental damage, taking into account damage to soil, water, air and climate. In our study, we also consider ammonia emissions explicitly based on FAO factors but are not as significant probably due to the conservative approach followed by FAO.

5.2.3 Continuous measurement and monitoring over time

An important value driver for the impacts calculated in this pilot is to monitor Eosta's impacts over time. This will in time reveal the effectiveness of decision making with regards to improving on Eosta's externalities. For this a continuous data collection, modelling, analysis and reporting system is required, in other words a dashboard. For this, first of all steady data-collection over time is required, since then the methodology can be improved and applied over all collected data iteratively.

6 Colophon

The *True Cost Accounting for Food, Farming & Finance* report was commissioned by Eosta BV in September 2016. It was written under supervision of Dr. Roel Drost, Senior Manager Cleantech & Sustainability Services at EY, and Tobias Bandel, director of Soil & More International.

Modelling and calculations were performed by Roel Drost, Arno Scheepens and Alexandro Moulopoulos of EY, and Tobias Bandel of Soil & More International.

This report is the first publication of the ongoing *True Cost Accounting for Food, Farming & Finance Pilot*, which was set up with the support of Triodos Bank and Hivos. It builds on previous work by the Natural Capital Protocol (NCP), Social Capital Protocol (SCP), The Environmental and Economics of Biodiversity for Food and Agriculture (TEEB AgFood), BioNext, the Sustainable Organic Agriculture Action Network (SOAAN/IFOAM) and the World Business Council for Sustainable Development (WBCSD).

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7 Appendix

7.1 Data sources

Different forms of data may be taken to carry out a comprehensive impact assessment. The most commonly used types of data are:

- **Primary activity data**: data taken from documents or computer systems (financial accounting) that are directly linked to the specific assessment, for example electricity invoices to calculate greenhouse gas emissions caused due to electricity.
- **Secondary data**: such as databases, studies, and reports.
- **Assumptions**: assumptions made based on internationally recognized standards and studies.

The data required for the assessment was collected during on-site visits or using SMI's data collection platform. Wherever possible, primary data was used. In case such primary data wasn't available, secondary data was used. In case the sources of this secondary data proved to be unreliable, assumptions were made.

The analysis of data was carried out on the basis of the following criteria:

- **Completeness**: a comprehensive assessment must be based on complete data, as too many assumptions might distort the final result.
- **Reliability**: data must be taken from reliable sources; it should be transparent and traceable.
- **Accuracy**: data must be as accurate as possible, also as to the specific process, product or company.
- **Time frame**: data must be taken from one particular, clearly defined period in time (which is usually a period of 12 months).
- **Geographical affiliation**: specific data for the assessed region, or country must be taken for the assessment.

7.2 Key references

- CE Delft, 2005. Luchtkwaliteit in Nederland: gezondheidseffecten en hun maatschappelijke kosten. Accessible through: http://www.google.nl/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0ahUKEwjFzPusmOzSAhWILhoKHZbIB6MQFggtMAA&url=http%3A%2F%2Fwww.ce.nl%2F%3Fgo%3Dhome.downloadPub%26id%3D348%26file%3D05_4094_27.pdf&usg=AFQjCNHrs3insWIKVo1g2hpG6XG_B3IGPw
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