Continuous Improvement of Sustainability in Dutch agro-products chains, 2017-2018

Towards a National Monitor Sustainable Food Using TSC

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Contents

Preface

The Sustainability Consortium (TSC) has developed a system that supports parties worldwide in measuring the sustainability of consumer products, also outside the third-party certifications. The system has been developed in partnership with Arizona State University, University of Arkansas and Wageningen University & Research and it has been used by a large number of companies worldwide.

In 2016, 2017 and 2018 TSC tested its globally applicable sustainability performance system in The Netherlands, in cooperation with a large group of participating companies under the umbrella of The Dutch Alliance for Sustainable Food (AVV). The goal of the pilot project partners was to stimulate continuous improvement of sustainability (CIS) of agro-products sold in the Netherlands in the coming years and beyond. Next to that, the pilot assessed the feasibility for developing a national monitoring system that measures the sustainability performance of food products sold in the Netherlands by using TSC pilot results from a variety of product categories and suppliers in the Netherlands. This report investigates the possibilities to use the TSC system in order to work out a national sustainable food monitor for 3 products sold on the Dutch market based on data from a large number of Dutch companies that implemented the TSC system in 2017. The conclusion is that TSC could deliver a good contribution to a national monitor, although some methodological issues need to be resolved first. The quality of the contribution strongly depends on how broad the implementation of TSC will be on the Dutch market in terms of both products and the companies involved, and the frequency of implementation. A separate report describes how the TSC system has been implemented with a large number of companies in the Dutch situation (Boone et al., 2019).

This study was commissioned and co-financed with public funds by the Top Sector Agro & Food and the Top Sector Horticulture & Propagation Materials in a public-private partnership. We are very grateful for their contribution. We are also very grateful for the contribution of the private funders: The Dutch Alliance for Sustainable Food (AVV is an alliance of all companies active in the Dutch food industry and represents Dutch retailers, food processers, hospitality and catering companies CBL, FNLI, LTO, KHN, Veneca, and Nevedi), Superunie, Sligro, Groenten Fruit Huis, Flora Holland, Benefits of Nature, Albron, PRé Consultants, Unilever and Grodan. The Steering Committee consisted of: Floor Uitterhoeve en Tim Lohmann (FNLI), Erwin Maathuis (Dutch Ministry of Agriculture, Nature and Food Quality), Marieke Doolaard (CBL), Anniek Mauser (Unilever), Stefanie Wienhoven (Grodan), Inge van Disseldorp (Sligro), Ineke Snijders (Albron), Cindy Verhoeven (Superunie), Gijs Kok and Piet Briët (Flora Holland), Henri Potze and Rick van der Linden (Benefits of Nature), Eric Mieras and Anne van Gaasbeek (Pré Consultants). We thank the Steering Committee for the pleasant and constructive collaboration and for their valuable comments and suggestions on the final draft version of this report. We thank them especially for the pleasant and constructive way in which they have guided research.

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Executive summary

S.1 Background and purpose

Little is known about the speed at which the sustainability of food products is taking place in the Netherlands. Several extra-legal initiatives in the Netherlands comprise a national monitoring of the level of sustainability in the food sector. One example hereof is the Sustainable Food Monitor, in Dutch Monitor Duurzaam Voedsel (MDV) (Logatcheva et al., 2018), commissioned by the Dutch government and run by Wageningen Economic Research. The MDV measures the share of third-party certified sustainable products on the Dutch market. It includes certification systems such as ASC, Organic, BeterLeven, Fair Trade/Max Havelaar, MSC, Milieukeur, Rainforest Alliance, UTZ Certified, and Label Rouge. One limitation of the MDV is that it does not sufficiently reflect on all sustainability efforts other than third-party certification made by farmers, traders, processors, wholesalers, brand manufacturers, retailers and caterers.

The Sustainability Consortium (TSC) developed a system that supports parties worldwide in measuring the sustainability of consumer products, beyond the third-party certifications (Box S1). The system has been developed in partnership with Arizona State University, University of Arkansas and Wageningen University & Research and it has been used by a large number of companies worldwide. In 2016, 2017 and 2018 TSC tested its globally applicable sustainability performance system in the Netherlands, in cooperation with a large group of participating companies under the umbrella of The Dutch Alliance for Sustainable Food (AVV). The main goal was to stimulate continuous improvement of sustainability (CIS) of agro-products sold in the Netherlands in the coming years and beyond. In Boone et al. (2019) it is described how the TSC system has been implemented with a large number of companies in the Dutch situation in 2016, 2017 and 2018 (Boone et al., 2019).

Besides the main goal of improving sustainability, the pilot assessed the feasibility for developing a national monitoring system that measures the sustainability performance of food products sold in the Netherlands by using TSC pilot results from a variety of product categories and suppliers in the Netherlands. This report investigates the possibilities to use the TSC system as input for a national sustainable food monitor, by giving an example for 3 products sold on the Dutch market where data were assembled among a large number of Dutch companies that implemented the TSC system in 2017.

Box S1 The Sustainability Consortium

The Sustainability Consortium (TSC) is a global non-profit organisation in which nearly a hundred companies, NGOs and research institutions work together. Large multinationals from all parts of the chain such as Bayer, BASF, Unilever, Pepsico, Marks & Spencer and Walmart are the largest group of members. NGOs such as World Wildlife Fund and World Resource Institute are also members. The organisation is coordinated by three research institutions: Arizona State University, University of Arkansas and Wageningen University & Research.

TSC has developed questionnaires with indicators for 113 different product categories including more than 50 different food categories to monitor the sustainability performance of the suppliers and their chain partners. Examples of indicators are the amount of greenhouse gas emissions and input use per kg of product, percentage of recycling and food losses and different levels of sustainability measures. In the development of the indicators, existing sustainability initiatives such as certification were taken into account as far as possible, as referred to in the questionnaires. The questionnaires contain a maximum of 15 indicators and only deal with the hotspots (most relevant bottlenecks) per product category. They have been harmonised worldwide, so all buyers who use TSC send the same questions to their suppliers, so that the suppliers fill out one questionnaire for several customers. Sometimes, due to global harmonisation, a number of indicators are not relevant or a number of hotspots are missing in specific situations, but in most cases the system works more effectively and efficiently than using a large number of region, product, company and theme specific systems.

The questionnaires are offered in so-called toolkits with extensive instructions, relevant background information and references. Furthermore, the toolkits contain a number of suggestions for sustainability. In addition to 'science-based', the toolkits are also 'stakeholder-informed' (a broad group of stakeholders is involved in the development). Completing the questionnaires can be done via online software that is constantly being developed for the convenience of the user and the generation of benchmark reports.

S.2 Methodology and issues of concerns when aggregating results

In 2017, the CIS-pilot partners decided to survey the following three product categories processed potatoes, tomato soup and orange. After selecting the product categories, the inquiring retailers, wholesalers and caterers decided on the number of suppliers included in the survey and finally which supplier to include in that survey. To monitor optimally the sustainability of the CIS-pilot suppliers, in some situations the research team customised the global applicable TSC toolkit. The intent of such a customisation was to fit the TSC global toolkit closely to the needs of the participating Dutch retailers, wholesalers, caterers and suppliers, and connect with applicable tools and national sector initiatives. Moreover, such a customisation of the CIS survey intended to improve the answerability and multi-year scalability of the TSC global toolkit to a nationwide monitoring framework. Multiple approaches were possible to aggregate results into a sector score. An option was to simply average the sustainability scores of the suppliers, but that approach did not take into account the size of the suppliers. That is why the market share of CIS-pilot suppliers was used as a proxy to correct for differences in business size within a product category. For example, the CIS pilot surveyed four of the six largest producers of processed potatoes in the Netherlands and their market share was already high. If the other two large producers were participating in the CIS pilot, a coverage of the market share of almost 95% would be achieved. A supplier's results per TSC-KPI are converted in a KPI score and then weighted by the supplier's market share to calculate its national score. Diversity in market share estimations may have significant impacts on a product's sustainability performance. The higher the KPI score variation among suppliers the larger the effect of the market share on the sustainability performance. Assumptions of a supplier's market share may therefore strongly affect the conclusion on sustainability performance. The assumptions are quantified in scenarios depending on the data sources available. Data came from external data sources like sectoral and trade associations reports, national statistics (CBS), company and market research databases (Orbis and Euromonitor International), and company websites and annual reports.

There are issues of concern when aggregating CIS-pilot results into a national total based on the market share methodology. The CIS-pilot survey reflected a non-random selection of suppliers of the total sales by Dutch retailers, wholesalers and caterers. The suppliers surveyed, however, cover a sometimes-large part of the market within a specific product category. Even within a product category, the scope of a survey was sometimes narrowed down to a more detailed level than the TSC product category aimed for, to better fitted the range of products supplied and finally to make the results better comparable between suppliers. The three product categories differ in scope (i.e. specific product within a generic product category), complexity (i.e. multiple ingredients) and place of origin (i.e., agricultural production in the Netherlands and/or abroad). Obviously, scope, complexity and place of origin may cause multiple issues when aggregating the CIS-survey results.

S.3 Case studies

The aggregation of CIS-pilot survey results into a national level has been done based on three product categories: processed potatoes, tomato soup, and orange juice. Each case deals with assumptions on assumptions on product & market definition and market share scenarios, and the KPI customisation and suppliers KPI sustainability performance weighted by the supplier's market share scenarios.

Processed potatoes includes industrial processed potatoes into various semi-finished and finished products, mainly consisting of one ingredient (potatoes). The geographic market involves the Dutch domestic market at retail, wholesale and catering. This includes domestic and foreign potato growing. Total availability of processed potatoes on the domestic market is 737m euros. The CIS-pilot surveyed four from the six biggest processed potatoes producers: McCain, Aviko, Agristo and Farm Frites. We estimated their market share based on four scenarios (see Section 3.1).

Tomato soup includes industrial processed food products into various semi-finished and finished products that are composed of tomatoes as the primary ingredient in addition to multiple plant- and animal-based ingredients. The geographic market involves the Dutch domestic market at retail, wholesale and catering. This includes domestic and foreign produced soup. Total availability of soup on the domestic market is 161.5m euros. The CIS-pilot surveyed 4 soup

producers in the Netherlands: Unilever, Struik, Larco and Hutten. We estimated their market share based on two scenarios (see Section 3.2).

Orange juice includes processed forms of oranges that contain 100% juice from one fruit entity. The geographic market involves the Dutch domestic market at retail, wholesale and catering. This includes domestic and foreign produced orange juice. Total availability of orange juice on the domestic market is 87m euros. The CIS-pilot surveyed the following 4 orange juice reducers: Royal Friesland Campina, Jaguar, Refresco and Appelaere. We estimated their market share based on two scenarios (see Section 3.3).

S.4 Results

The CIS-pilot surveyed four processed potatoes producers and we estimated their market share based on four scenarios, with a total market share representation varying between 17-75% (see Section 3.1).

The CIS-pilot surveyed four soup producers in the Netherlands and we estimated their market share based on two scenarios, with a total market share representation varying between 15-55% (see Section 3.2).

The CIS-pilot surveyed the four orange juice reducers and we estimated their market share based on two scenarios, with a total market share representation varying between 10-31% (see Section 3.3).

The supplier's results per TSC-KPI and product are converted in a KPI score and weighted by the supplier's market share scenarios to calculate a national score. The result show that diversity in market share estimations may have significant impacts on a product's national sustainability performance (see Figure S.1, Figure S.2 and Figure S.3). KPIs with a high variety in responses given by the CIS-pilot supplier show different conclusions, depending on the market shares used to calculate a national total score.

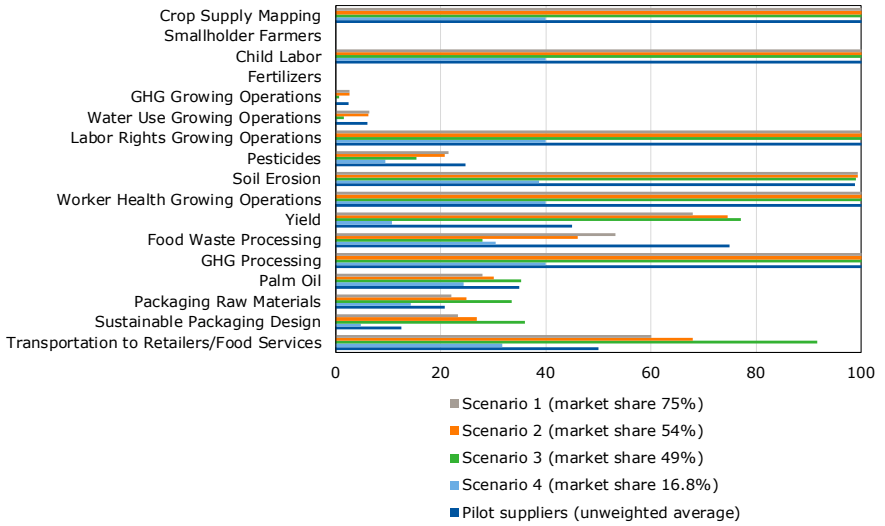

Figure S.1 KPI scores (CIS-pilot unweighted and market share scenarios weighted) for processed potatoes in the Netherlands, 2016
Source: own calculations based on TSC data.

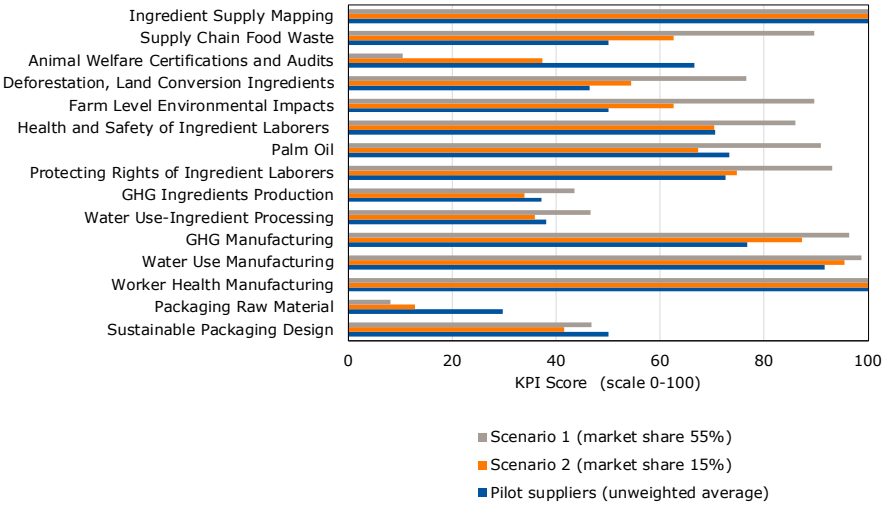

Figure S.2 KPI scores (CIS-pilot unweighted and market share scenarios weighted) for tomato soup in the Netherlands, 2016
Source: own calculations based on TSC data.

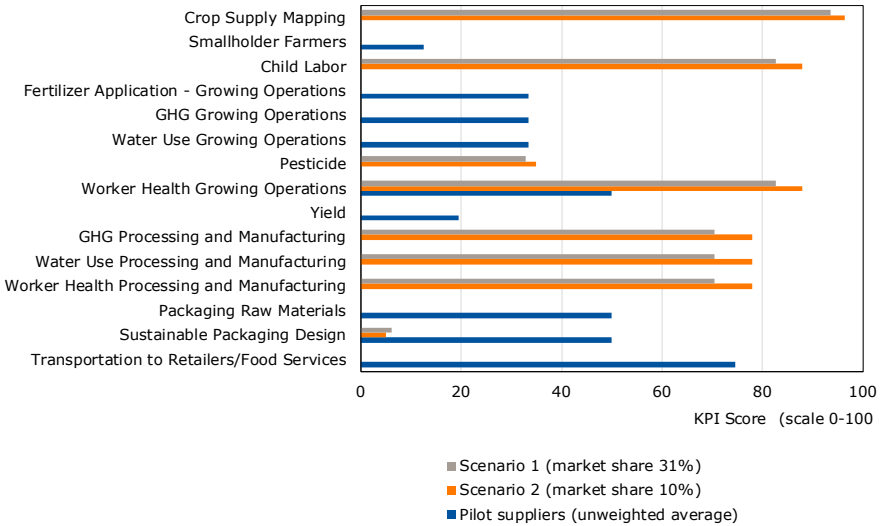

Figure S.3 KPI scores (CIS-pilot unweighted and market share scenarios weighted) for orange juice in the Netherlands, 2016
Source: own calculations based on TSC data.

S.5 Conclusion and Reflection

A general conclusion of this analysis is that, the data gathered via the CIS-pilot could be a valuable source of data for expanding the current national monitoring system because it covers additional sustainability efforts other than third-party certification made by farmers, traders, processors, wholesalers, brand manufacturers, retailers and caterers. The TSC approach presented here may guide governmental, non-governmental and private organisations broadly implement the TSC toolkits in the Netherlands which is currently not the case yet. However, the TSC approach will only work if it takes into account the issues the following issues:

- Representability - the pilot suppliers were non-randomly selected. Some KPI's can't be answered by all companies so data for this indicator at national level is not available. A way to deal with this problem, is to send out some additional surveys to companies that were not yet involved in the TSC pilot. In addition, if the TSC system is broadly implemented however this risk of a non-representative sample, will become quickly smaller.
- Weighting - suppliers may differ largely in size and that is why reliable estimates of market share are important in order to get a balanced weighting. A quick scan of different approaches shows that this is not easily realised based on public sources.
- Frequency - in the pilot companies filled the toolkits only once. For a useful monitoring, it needs to be implemented on a regular basis (e.g., annually) to monitor performance over time.
- Verification and validation of results - for any monitoring system, verification of results is important. In case of TSC KPIs, there is a potential bias of differences in interpretation by a respondent, deliberately filling in the most-desired response by a respondent, or the use of various tools with different calculation methodologies to calculate an answer. In the pilot, the researchers verified the KPI responses provided by suppliers with interviews. Implementation of TSC, will profit from verification of responses but it could also significantly increase the costs.
- Hotspot coverage - TSC KPIs are designed to support retailers/wholesalers /caterers to assemble data about their supply chain to discuss improvements with their direct suppliers. Some hotspots related to retail and consumer are out of scope within TSC or are only indirectly addressed through the way suppliers can influence these hotspots.
- KPI customisation and linkages to national goals - some customisation of the globally applicable KPI's is advised to align with national goals/sector initiatives.
- Administrative burden & best available data sources - in some cases better data sources than TSC are available. Especially for Dutch farming (public) data may be available.
- Ownership data - suppliers that filled the toolkits, remain the owner of the data and should decide/approve for which purposes the data can be used.

1

Introduction and background CIS-pilot

1. Introduction and background CIS-pilot

1.1 Why a National Monitor Sustainable Food?

In 2016, 2017 and 2018 The Sustainability Consortium (TSC) tested its globally applicable sustainability performance tools in the Netherlands, in cooperation with a large group of participating companies under the umbrella of The Dutch Alliance for Sustainable Food (AVV) (TSC, 2018). Several retailers, wholesalers, caterers and suppliers in the Netherlands gained insight in their sustainability performance. The TSC system enabled them to prioritise the most relevant sustainability issues and improvement opportunities. By sharing these insights with supply chain partners, companies had a sound basis for discussing the development towards more sustainable products. The goal of project partners was not only to start a dialogue, but also to stimulate continuous improvement of sustainability (CIS) of agro-products sold in the Netherlands in the coming years and beyond.

In 2016, TSC piloted Product Sustainability Toolkits for grain-based products, beef and grapes, followed by avocado, mango, orange juice, processed potatoes and tomato soup in 2017. Finally, in 2018 TSC piloted another six product categories: disposable products, beef, coffee, dairy/cheese, bake-off, peppers and cucumbers. A separate report describes how the TSC system has been implemented with a large number of companies in the Dutch situation in 2016, 2017 and 2018 (Boone et al., 2019).

Several extra-legal initiatives in the Netherlands comprise a national monitoring of the level of sustainability in the food sector. One example hereof is the Sustainable Food Monitor (in Dutch: Monitor Duurzaam Voedsel, hereafter MDV, Logatcheva et al., 2018), commissioned by the Dutch government and run by Wageningen Economic Research. The MDV measures consumer spending on certified sustainable products in Dutch supermarkets, out-of-home food markets and organic specialist shops. It includes third-party certification systems such as ASC, Organic, BeterLeven, Fair Trade/Max Havelaar, MSC, Milieukeur, Rainforest Alliance, UTZ Certified, and Label Rouge. One limitation of the MDV is that it does not sufficiently reflect on all sustainability efforts other than third-party certification made by farmers, traders, processors, wholesalers, brand manufacturers, retailers and caterers. Additional data on sustainability efforts that do not lead to certification need to be incorporated in order to develop a complete national monitoring system. Currently the MDV investigates the possibilities for expanding the national monitoring system by including supplementary data that covers these additional sustainability efforts (Wageningen Economic Research, 2018). These data, however, are limitedly available in existing databases so new assembling of these data will be necessary. However, assembling new data could result in higher administrative burden and subsequently higher costs for both business that have to respond to new surveys and the organisations that have to start assembling the data.

Next to measuring the continuous improvement of sustainability (CIS) at product level, the CIS-pilot partners set up an additional goal for the project: exploring the potential of using CIS-pilot results for a national monitoring system that measures the sustainability performance of the complete food sector in the Netherlands (TSC, 2017). A solution may be to use TSC-data to monitor sustainability performance. The CIS-pilot focuses on feasibility of using TSC to monitor the level of sustainability of food products, by assembling data from a wide variety of product categories and suppliers.

This report explores the possibilities to use CIS-pilot data for a national monitor. It describes an approach to aggregate the individual supplier responses into a sector score and takes into account methodological issues of using TSC for computing such a score (see Chapter 2). This approach is illustrated by three case studies: processed potatoes, tomato soup and orange juice (see Chapter 3). The report concludes with a reflection on the methodological issues, case studies, and possible expansion of the current national monitoring system by including supplementary data that covers additional sustainability efforts (see Chapter 4).

1.2 What is TSC

The Sustainability Consortium

The Sustainability Consortium (TSC) is a global non-profit organisation in which nearly a hundred companies, NGOs and research institutions work together. Large multinationals from all parts of the chain such as Bayer, BASF, Unilever, Pepsico, Marks & Spencer and Walmart are the largest group of members. NGOs such as World Wildlife Fund and World Resource Institute are also members. The organisation is coordinated by three research institutions: Arizona State University, University of Arkansas and Wageningen University & Research.

Global applicable toolkits with key performance indicators
TSC has developed questionnaires with indicators for 113 different product categories including more than 50 different food categories to monitor the sustainability performance of the suppliers and their chain partners. Examples of indicators are the amount of greenhouse gas emissions and input use per kg of product, percentage of recycling and food losses and different levels of sustainability measures. In the development of the indicators, existing sustainability initiatives such as certification were taken into account as far as possible, as referred to in the questionnaires. The questionnaires contain a maximum of 15 indicators and only deal with the hotspots (most relevant bottlenecks) per product category. They have been harmonised worldwide, so all buyers who use TSC send the same questions to their suppliers, so that the suppliers fill out one questionnaire for several customers. Sometimes, due to global harmonisation, a number of indicators are not relevant or a number of hotspots are missing in specific situations, but in most cases the system works more effectively and efficiently than using a large number of region, product, company and theme specific systems.

The questionnaires are offered in so-called toolkits with extensive instructions, relevant background information and references. Furthermore, the toolkits contain a number of suggestions for sustainability. In addition to 'science-based', the toolkits are also 'stakeholder-informed' (a broad group of stakeholders is involved in the development). Completing the questionnaires can be done via online software that is constantly being developed for the convenience of the user and the generation of benchmark reports.

See TSC website for more information

2

Methodology and issues of concerns

2. Methodology and issues of concerns when aggregating CIS-pilot results

This chapter presents a methodology to aggregate the CIS-pilot results based on market shares (Section 2.1) and describes issues of concern when aggregating CIS-pilot results into a national total (Section 2.2).

2.1 Methodology

Regionalisation & scope of toolkit

The goal of the CIS-pilot is to give insight in the level of sustainability of the consumer goods sold and to stimulate improvements at retail, wholesale, catering and supplier level by using the TSC product category toolkits. The CIS-pilot tested the applicability and feasibility of implementing the TSC toolkits in the Netherlands for several product categories. The CIS-pilot partners decided to survey the number of product categories, covering a range of variety and complexity of their total sales. After selecting the product categories, the inquiring retailers, wholesalers and caterers decided on the number of suppliers included in the survey and finally which supplier to include in that survey. There was not an objective or ultimate framework to cover all products sold, or all types of suppliers. A separate report describes how the TSC system has been implemented with a large number of companies in the Dutch situation in 2016, 2017 and 2018 (Boone et al., 2019).

To monitor optimally the sustainability of the CIS-pilot suppliers, in some situations the research team customised the global applicable TSC toolkit. The intent of such a customisation was to fit the TSC global toolkit closely to the needs of the participating Dutch retailers, wholesalers, caterers and suppliers, and connect with applicable tools and national sector initiatives. Moreover, such a customisation of the CIS-survey intended to improve the answerability and multi-year scalability of the TSC global toolkit to a nationwide monitoring framework. See Appendix B for the customisation per case study. The customisation has taken place based on the ability of a toolkit/KPI to:

- differentiate among suppliers;
- align with sector initiatives;
- align with a scope of the surveyed products.

The ability to differentiate among suppliers

TSC aims to use the same KPIs worldwide wherever possible. Retailers often operate globally, or sell consumer products with a (partial) international supply chain, so a TSC KPI targets to differentiate the broad variety of global suppliers based on their KPI responses that should span a range of performance that allows both average companies and leading companies to report progress over time. TSC use the data to set an agenda and identify opportunities for special attention (i.e., fertiliser optimisation or improved animal welfare), to help drive continuous improvement more quickly. In some cases, the global TSC KPI did not differentiate among CIS-suppliers. For each of these cases, TSC customised the KPI. In some cases, a sub-question was added. For example, the animal welfare KPI was extended with an extra question about extra statutory requirements. In other cases, response options were combined or added. Having additional response options enabled the retailer to get a more balanced insight in measures taken by a pilot supplier.

The ability to align with sector initiatives

Alignment with sector initiatives is very important for TSC to minimise administrative burden for suppliers. The alignment, however, mostly comprises global, continental and multi-national initiatives. In the Netherlands, there are many examples of sector initiatives that strive for harmonisation in measurement (e.g. in the dairy sector) (Dutch Dairy Association, 2018), data assembling (e.g., cultivation registration, in Dutch: teeltregistratie) or continuous improvement (e.g., Dutch Alliance for Sustainable Palm Oil, 2018)

that are not necessarily embedded in the global TSC framework. Wherever possible, the CIS-pilot KPIs were customised in order to align with these sector initiatives. In some cases, the customisation was limited to only adding a tool or standard. In other cases, KPIs response options were tweaked or replaced. Having alignment with sector initiatives enables the answerability and multi-year scalability of the TSC global toolkits in the Dutch situation. For example, one of the KPIs used in the CIS-pilot addresses deforestation and land conversion impacts associated with palm oil production. Aligning this KPI with the Dutch Alliance for Sustainable Palm Oil makes it relatively easy to answer this KPI because it refers the Dutch Alliance for Sustainable Palm Oil directly in the KPI guidance section. For example, the guidance may say 'the percent of your supply complying with the Dutch Alliance for Sustainable Palm Oil principles can be included in your response'.

Scope of products

Next to aligning with the worldwide KPIs and regional sector initiatives, the scope of the product categories in the CIS-pilot was sometimes narrowed down to a more detailed level than the TSC product category aimed for, in order to better fit the range of products supplied by the participating suppliers. For example, the CIS-pilot surveyed processed potatoes, whereas TSC has a toolkit for unprocessed potatoes. In this toolkit the major part of social and environmental hotspots occur at the farm-level only. The CIS-pilot suppliers are in close contact with potato growers that enables them to assemble farm-level information. Next to the hotspots at farm-level, for processed potatoes there are also hotspots at manufacturing level (i.e. greenhouse gas emission, non-renewable energy depletion etc.). Furthermore, within the manufacturing stage, besides potatoes other ingredients with significant impact play an important role (e.g., palm oil), and they were added to the CIS-pilot processed potatoes toolkit. Within TSC, two toolkits are available that potentially cover the hotspots of the surveyed products in the CIS-pilot: the TSC Global Root Vegetable Toolkit and the TSC Global Complex Food Toolkit. Choosing the Root Vegetable Toolkit would result in only covering impact within the potato supply chain. Choosing for the Complex Food toolkit would result in covering impacts during manufacturing, but it has limited information about impact related to potato growing. Therefore, the CIS-pilot combined these toolkits. The Global Root Vegetable Toolkit was extend with KPIs on palm oil and greenhouse gas emission during manufacturing from the Complex Food toolkit.

Methodology to aggregate results based on market shares

The CIS-pilot provided results on sustainability from individual retail and food services suppliers. Multiple approaches are possible to aggregate results into a sector score. An option is to simply average the scores of the suppliers, but that approach does not take size of the supplier into account. The market share of CIS-pilot suppliers is used as a proxy to correct for differences in business size within a product category. In some cases the market share of participating companies was already high. For example, in 2017 the CIS-pilot surveyed four of the six largest producers of processed potatoes in The Netherlands. If the other two large producers were participating in the CIS-pilot, a coverage of the market share of almost 95% would be achieved.

After adapting the toolkits to the Dutch situation the next step is to define the scope of the market share (in sales and geography).[1] Here we define issues such as nature of the product (single-based vs complex product and its link to national classifications), type of market channels (e.g., retail, wholesale, catering), and where the product came from (e.g., domestic production, consumption, import, export). The next step is to calculate the market share of a CIS-supplier. The market share of a CIS-supplier is the sales by a company divided by the total industry sales over a specified period (formula 1).

*(1) Market share$_{x,y,z}$ = (Sales$_{x,y,z}$ / ∑Sales$_{y,z}$) * 100 whereby x= CIS-supplier; y=product; z=year*

Data came from external data sources like sectoral and trade associations reports, national statistics (CBS), company and market research databases (Orbis and Euromonitor International), and company's websites and annual reports (see Data Reference List for more information). These data are used to estimate a market-share in various scenarios, depending on the data sources available (see Chapter 3).

[1] See Appendix A for definitions.

Effect of market share on sustainability KPI performances

A supplier's results per TSC-KPI are converted in a KPI score and then weighted by the supplier's market share to calculate its national score (formula 2). Diversity in market share estimations may have significant impacts on a product's sustainability performance. The higher the KPI score variation among suppliers the larger the effect of the market share on the sustainability performance. Assumptions of a supplier's market share may therefore strongly affect the conclusion on sustainability performance. The assumptions are quantified in scenarios. In Chapter 3, the impact of market shares computations is quantified per KPI.

(1) $KPIscore_{y,z} = \sum(KPIscore_{x,y,z} * Market\ share_{x,y,z})$ *whereby x= CIS-supplier; y=product; z=year*

2.2 Issues of concern when aggregating CIS-pilot results into a national total

The CIS-survey reflected a non-random selection of suppliers of the total sales by Dutch retailers, wholesalers and caterers. The suppliers surveyed, however, cover a sometimes-large part of the market within a specific product category. In addition, the data assembled by TSC are company data and therefore potentially an interesting data source for monitoring the level of sustainability and improvement potential. In this section, some issues of concern are discussed when aggregating the CIS-pilot data. Chapter 3 tests the aggregation of the CIS-survey results into a national total for the following three product categories: processed potatoes, tomato soup and orange juice. These three product categories differ in scope (i.e. specific product within a generic product category), complexity (i.e. multiple ingredients) and place of origin (i.e., agricultural production in the Netherlands and/or abroad). Obviously, scope, complexity and place of origin may cause multiple issues when aggregating the CIS-survey results. The succeeding sub-sections define these issues of concern and elaborate upon them for aggregating CIS-pilot results into a national total:

- use of sample
- scope of sustainability themes & supply chain
- assembling & verification

Use of sample

The approach described in Section 2.1 works for testing the applicability and feasibility of the TSC surveys, and provides practically areas and way of improvement for the CIS-pilot partners and involved suppliers. For aggregation of the suppliers' results into a national total, there may however be some biases.

Inquiring parties

The survey results were gathered from suppliers that delivered to retailers, wholesalers and caterers that participated in the CIS-pilot. The objective of the pilot partners to participate within the CIS-pilot, was to improve the sustainability of their products sold in the Netherlands. Scaling-up these pilot results may bias a conclusion of the overall level of sustainability because it is unknown if the pilot partners differ from the 'national-average retailers, wholesalers and caterers' in terms of products sold, suppliers and maturity level of sustainability.

Participating suppliers

For aggregation of the suppliers' results into a national total, a similar bias may occur. Similar to the inquiring pilot partners a possible bias exists regarding the selection of their suppliers that might not be representative for the maturity level of sustainability for the whole product category as well. For example, having frontrunner suppliers in the pilot increases the possibility of overestimating the overall level of sustainability of the piloted product category in question. Furthermore, the pilot suppliers are a non-random mixture of small and large-scale products suppliers which may potentially lead to (over)underrepresentation, which in turn may affect their market size estimations in the pilot. Moreover, the size of the supplier may affect the ability to give an answer to the CIS-survey. Small suppliers do not have a person or system in place to respond to specific sustainability survey questions. Large suppliers sometimes have difficulties to breakdown a response to the product (category) surveyed. However, we have no reason to assume that suppliers in the survey are more advanced in sustainability or small or large suppliers are (over)underrepresented but both issues should be addressed here.

Scope of sustainability themes & supply chain

TSC designs KPI questions that measure the performance of brand manufacturers against environmental and social hotspots within the life cycle stages of a product category, either at the request of a retailer or for self-assessment. KPIs on the latter part of the supply chain, i.e. retail-, consumer-, and end-of-life-stage, are not always included in the toolkits or they are somehow indirect addressed (e.g., packaging of supplier may reduce food waste at retail or consumer level). For agricultural supply chain, in general, most of the impact occur in supply chain stages prior to the retailer.

Some hotspots related to retail, consumer health or consumer safety are out of scope within TSC. A national monitor in the Netherlands may also include retail, consumer health and welfare as a hotspot. Hotspots related to food waste at retail-suppliers level, obesity, high-levels of salt, sugar or saturated fats, or zoonotic diseases, for example, are not covered with the KPIs from TSC.

Assembling & verification

TSC develops toolkits to measure the level of sustainability on hotspots in supply chains of consumer products. There is no formal verification required in order to provide an answer to a KPI. The toolkits contain KPIs that ask for a part of supply that meets with particular requirements highlighted in the guidance. For example all the necessary requirements to respond to a KPI are included in the KPIs' guidance section and it refers subsequently to guiding examples, i.e., not limited, of a so-called list ready to use certifications, standards, and tools that might help the respondents to answer that KPI. In the CIS-pilot, TSC-researchers verified the supplier's responses by conducting interviews with them. That minimises the possibility of misinterpretation of the KPIs, but it does not comprise a verification or audit of their results. Three biases may occur.

Differences in interpretation by the respondent

All KPIs leave room for interpretation by the respondent. There is a possibility that suppliers do not differ in their actual performance, but they may have a different score due to their own interpretation. Sometimes a KPI is relatively easy to answer because it refers directly to ready to use certifications, standard, and tools in the KPI's guidance section. For example, the guidance may say 'the percent of your supply from GlobalG.A.P. certified farms can be included in your response'. Some suppliers may respond initially that they are not able to answer the KPI, since they do not participate in one of the ready to use certifications, standards, and tools mentioned in the guidance section.

Deliberately filling in the most-desired response

It did not happened in the CIS-pilot, but there is a risk of deliberately filling in the most-desired response. For all KPIs, a scoring model converts a supplier's response into a 0-100 scale sustainability score. With a little understanding of which response option is the most-desired, a respondent might fill in a response that overestimates the real level of sustainability. Without a form of verification, this bias is difficult to tackle. In the CIS-pilot, TSC-researchers verified the responses with interviews. That minimises the possibility of using different ways of interpretation of the same question, but it does not comprise a verification or audit of the results.

Differences in tools

For quantitative KPIs, a computation is necessary to fill in a response. In the guidance section of a KPI, TSC specifies how to calculate the answer and refers to ready-to-use tools. TSC does not prescribe the use of one tool or another, but calls out for high-level requirements that need to be taken into account when using such a tool. However, tools sometimes differ in the methodology to calculate the KPI results. For example, issues regarding the use of different secondary data sources, having different mathematical model, or differences in conceptual choices (e.g. allocation).

3

Case studies results CIS pilot 2017

3. Case studies results CIS pilot 2017

This chapter describes aggregation of CIS-survey results into a national total for three product categories. The product categories are processed potatoes, tomato soup, and orange juice. Each case contains two sections that describes the assumptions on product & market definition and market share scenarios, and the KPI customisation and suppliers KPI sustainability performance.

3.1 Processed potatoes

Product & market definitions, market share scenarios

The scope of the CIS-survey involves industrial processed potatoes into various semi-finished and finished products, mainly consisting of one ingredient (potatoes):

- fresh or pre-baked products (i.e., fries, cubes, slices, pommes parisiennes);
- dried products (granulate);
- 'specialties', other than pre-baked or dried products (peeled and preserved potatoes, potato salads, potato croquettes, ready meals).

The geographic market involves the Dutch domestic market at retail, wholesale and catering. This includes domestic and foreign potato growing. Total availability of processed potatoes on the domestic market is 737m euros (Figure 3.1).

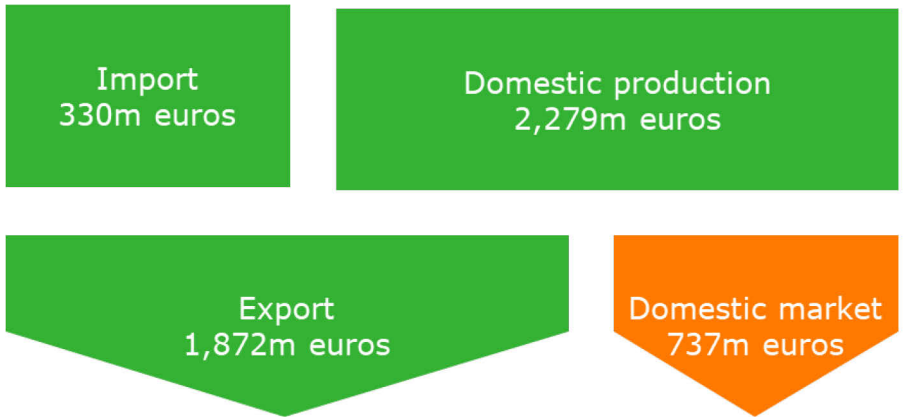

Figure 3.1 Import, export and domestic production of processed potatoes, 2016
Source: CBS.[2]

Market shares

The Dutch Potato Processing Industry (Vavi) publishes data on the six largest processed potato companies in the Netherlands. According to Vavi the total operating revenue for processed potatoes from these companies in 2016 was 2,140m euros. This number corresponds to 94% of the total domestic production in the Netherlands (Figure 3.1). The majority is exported and not available for the domestic market. Approximately 15% of the export is re-export. Next to domestic products, imported processed potatoes may be available for the domestic market as well, but a large part of the import is re-export.

[2] **Domestic production** = Per 1,000,000 euros CBS code 10311130 Potatoes and potato products, frozen, eg pre-baked, preserved exclusively in vinegar or acetic acid + 10311460 Potatoes and potato products, preserved, not frozen, excluding flour, groats and flakes; Import and export = Per 1,000,000 euros CBS code 2004101000 Potatoes, only cooked or fried, frozen + 2004109900 Potatoes (prepared or preserved otherwise than by vinegar or acetic acid), frozen (excluding only cooked or baked potatoes and potatoes in the form of flour, groats, meal or flakes) + 2005208000 Potatoes, prepared or preserved, without vinegar or acetic acid (not frozen, and in the form of flour, groats, meal or flakes, or in slices, fried, whether or not salted or flavoured, airtight) packed, suitable for immediate consumption + 2005202000 Potatoes in slices, fried, whether or not salted or flavoured, hermetically sealed, suitable for immediate consumption (not frozen).

The CIS-pilot surveyed four from the six biggest processed potatoes producers: McCain, Aviko, Agristo and Farm Frites. Based on four scenarios their total market share representation should be varying between 17-75% (Figure 3.2). Figure 3.2 shows ammonised data of the four processed potatoes producers and the order in which they are displayed is random.

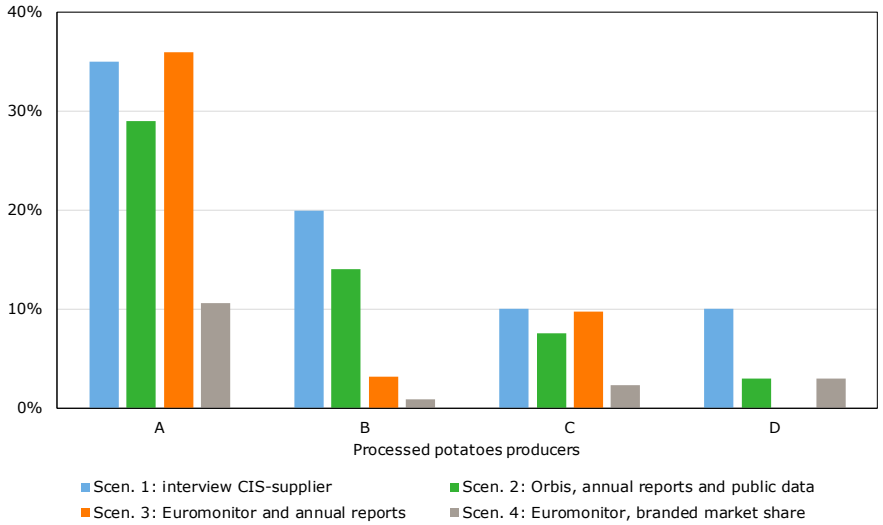

Figure 3.2 Market share of processed potatoes in the Netherlands, 2016 a)
a) Ammonised data of the four processed potatoes producers and the order in which they are displayed are random
Source: Orbis, Euromonitor International, and Boone et al. (2019).

Market share scenarios
Scenario 1: Interview with CIS-pilot suppliers and annual report data
An interview with CIS-pilot suppliers and reviewing their annual reports were the basis of this scenario. A supplier's market share is calculated as their operating revenue divided by the total domestic production value, resulting in a total market share of 75%:

- Processed potatoes producer A: 35% (of which 50% pre-baked and 30% fresh products, data: Annual sustainability report);
- Processed potatoes producer B: 20% (of which 60% pre-baked and 25% fresh products, data: Annual sustainability report);
- Processed potatoes producer C: 10%;
- Processed potatoes producer D: <10%.

Scenario 2: Market share based on Orbis data, annual reports and other public available data such as Consultancy.nl and Interimmanagementbureaus.nl
In Scenario 2, the market share was estimated based on Orbis data, annual reports and other public available data. The total market share for the four CIS-suppliers was about 54%:

- Processed potatoes producer A: The total operating revenue was 821m euros. Based on its annual sustainability report data, 80% is allocated to processed potatoes (50% pre-baked and 30% fresh products) resulting in a market share of 29%;
- Processed potatoes producer B: The total operating revenue was 362m euros. Based on its annual sustainability report data, 85% is allocated to processed potatoes (60% pre-baked and 25% fresh products) resulting in a market share of 14%;
- Processed potatoes producer C: The total operating revenue was 174m euros and all allocated to processed potatoes resulting in a market share of 7.6%;
- Processed potatoes producer D: The total operating revenue was 76m euros and all allocated to processed potatoes resulting in a market share of 3.3%.

Scenario 3: Market share based on Euromonitor and annual reports
In Scenario 3, the market share was estimated based on Euromonitor International data and annual reports data. Euromonitor International data reports sales of processed potato in 2016 to be 120m euros. It also reports the sales per supplier. The total market share for the four CIS-suppliers was 49%:

- Processed potatoes producer A: Euromonitor reports a market share of 10.6% for processed fruit and vegetables. The total sales of fruit and vegetables in the Netherlands was 509.8m euros, so producers' A sales of processed fruit and vegetables were calculated as a total of 53.9m euros. Based on their annual sustainability report data, 80% is allocated to processed potatoes (50% pre-baked and 30% fresh products) resulting in a market share of 36%;

- Processed potatoes producer B: Euromonitor reports a market share of 0.9% for processed fruit and vegetables. Producers' B sales of processed fruit and vegetables were calculated as a total of 4.5m euros. Based on their annual sustainability report data, 85% is allocated to processed potatoes (60% pre-baked and 25% fresh products) resulting in a market share of 3.2%;
- Processed potatoes producer C: Euromonitor reports a market share of 2.3% for processed fruit and vegetables. Producers' C sales of processed fruit and vegetables were calculated as a total of 11.7m euros, all allocated to processed potatoes resulting in a market share of 9.8%;
- Processed potatoes producer D: For this supplier there is no market share data available in Euromonitor International.

Scenario 4: Market share based on Euromonitor (brands data) and annual reports

Scenario 4 is similar to scenario 3, but the market shares calculations are based on brands, resulting in lower market shares than in scenario 3. The total market share for the four CIS-suppliers was 16.8%:

- Processed potatoes producer A: 10.6%;
- Processed potatoes producer B: 0.9%;
- Processed potatoes producer C: 2.3%;
- Processed potatoes producer D: For this supplier there is no data on brand level available in Euromonitor International. However, Euromonitor reports a market share of 4.8% for all other private labels. Based on this data and taking into account the estimation in scenario 2 we assume a market share for producer D to be no more than 3%.

KPI customisation and suppliers KPI sustainability performance

The globally applicable TSC toolkit differs somehow from the toolkit used in the CIS-pilot. The main reason for this is a customisation of the CIS-survey. As discussed in Section 2.1.1 the intent of such a customisation was to closely link the KPIs with national sector initiatives of the participating Dutch retailers and food services in the CIS-pilot, and to improve the answerability and multi-year scalability of the TSC global toolkits in the Dutch situation in general.3 The CIS-pilot supplier's results per TSC-KPI are converted in a KPI score and weighted by the supplier's market share scenarios to calculate national scores. Diversity in market share estimations may have significant impacts on a product's national sustainability performance. KPIs with a high variety in responses given by the CIS-pilot supplier show different conclusions, depending on the market shares used to calculate a national total score (Figure 3.3). For your reference Figure 3.3 plots the unweighted average KPI scores of the CIS-pilot suppliers.

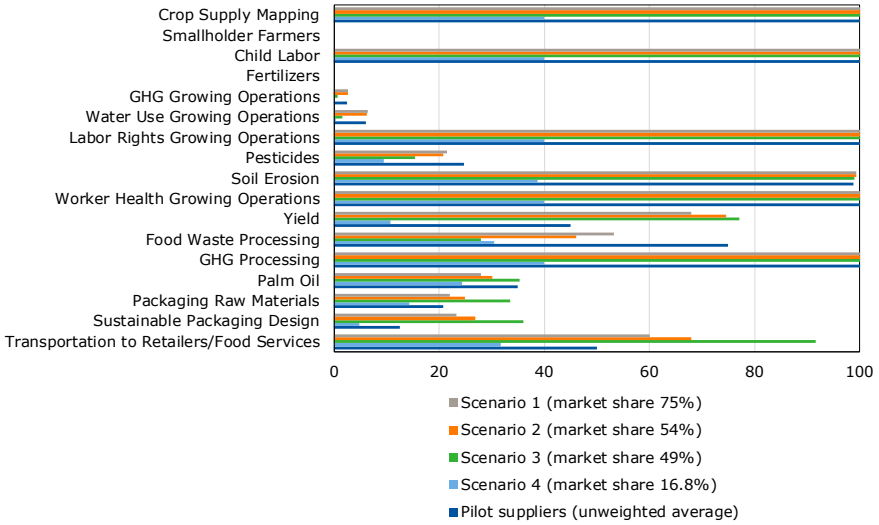

Figure 3.3 KPI scores (CIS-pilot unweighted and market share scenarios weighted) for processed potatoes in the Netherlands, 2016
Source: own calculations based on TSC data.

3.2 Tomato soup

Product & market definitions, market share scenarios

The relevant product market involves industrial processed food products into various semi-finished and finished products that are composed of multiple plant- and animal-based ingredients:

- fresh and ready-made soups;
- instant soups;
- bouillons for soup.

[3] See Appendix B for KPI customisations

CIS-pilot soup includes listed 3 types of products made with tomatoes as the primary ingredient (tomato soup) due to their interchangeability by the consumer in terms of their characteristics, prices and usage.

The geographic market involves the Dutch domestic market at retail, wholesale and catering. This includes domestic and foreign produced soup. Total availability of soup on the domestic market is 161,5m euros (Figure 3.4).

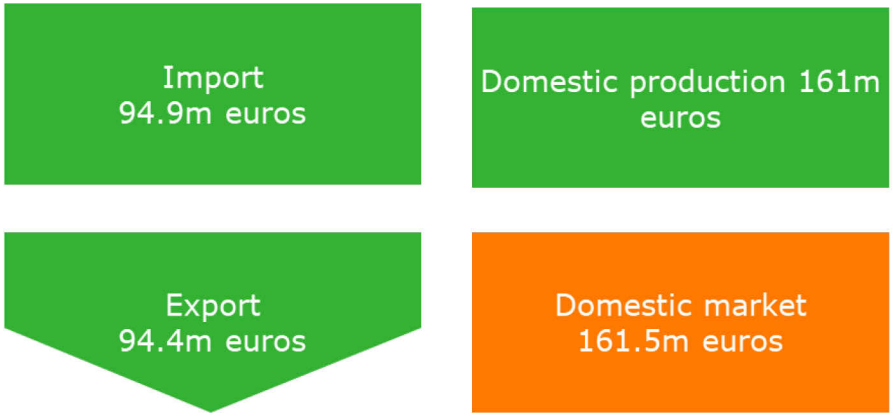

Figure 3.4 Import, export and domestic production of soup, 2016
Source: CBS.[4]

Market shares
The total domestic production of soup preparations and prepared soup in 2016 was 161m euros. This number corresponds to 99,7% of the total soup available on the Dutch market (Figure 3.4). Next to domestic production, only 0,5% of the imported soup may be available on the domestic market, because almost all of the imported soup equals the re-export of it.

According to Euromonitor International the following 4 companies are the biggest soup producers in the Netherlands with about 72% retail value in 2016: Unilever (48,2%), Heinz (15,2%), Albert Heijn (4,9%) and Struik (3,5%). Others count for 4,8% (Euromonitor international). The CIS-pilot surveyed soup made with tomatoes as the primary ingredient and we surveyed 2 from the 4 biggest soup producers listed above in addition to 2 other small producers.

Market share scenarios
Scenario 1: Market share based on product category soup with a broad scope
The CIS-pilot surveyed soup made with tomatoes as the primary ingredient. Assuming that the survey results are representative for all types of soup produced by the 4 producers participating in the CIS-pilot, TSC could extrapolate these results to their total soup sold in the Netherlands. Their market shares in 2016 have to be no more than 55%. Figure 3.5 shows ammonised data of the four soup producers and the order in which they are displayed is random (Figure 3.5).

Scenario 2: Market share based on Euromonitor (brands) and annual reports
Based on Euromonitor data TSC estimated the brand market shares of the 4 soup producers in 2016. The CIS-pilot surveyed soup made with tomatoes as the primary ingredient. Assuming that the survey results are representative for the soup brands of the CIS-pilot participants, TSC estimates their brand market shares in 2016 to be no more than 15%. Figure 3.5 shows ammonised data of the four soup producers and their brands. The order in which they are displayed is random (Figure 3.5).

[4] **Domestic production** = Per 1,000,000 euros CBS code 108911 Preparations for soup or bouillon; prepared soup and bouillon

Import and Export = Per 1,000,000 euros CBS code 2104100000 Preparations for soup or bouillon; prepared soup and bouillon.

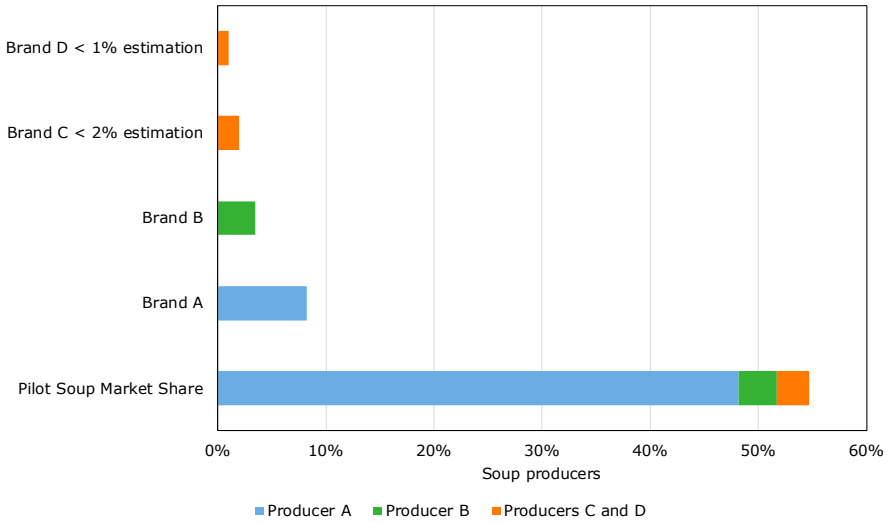

Figure 3.5 Market share of soup and branded soup market share in the Netherlands, 2016
Source: Euromonitor international.

KPI customisation and suppliers KPI sustainability performance

The globally applicable TSC toolkit differs somehow from the toolkit used in the CIS-pilot. The main reason for this is a customisation of the CIS-survey. As discussed in Section 2.1.1 the intent of such a customisation was to closely link the KPIs with national sector initiatives of the participating Dutch retailers and food services in the CIS-pilot, and to improve the answerability and multi-year scalability of the TSC global toolkits in the Dutch situation in general.[5] The CIS-pilot supplier's results per TSC-KPI are converted in a KPI score and weighted by the supplier's market share scenarios to calculate national scores. Similar to the processed potatoes case diversity in market share estimations may have significant impacts on a product's sustainability performance. KPIs with a high variety in responses given by the CIS-pilot supplier show different conclusions, depending on the market shares used to calculate a national total score (Figure 3.6). For your reference Figure 3.6 plots the unweighted average KPI scores of the CIS-pilot suppliers.

[5] See Appendix B for KPI customisations.

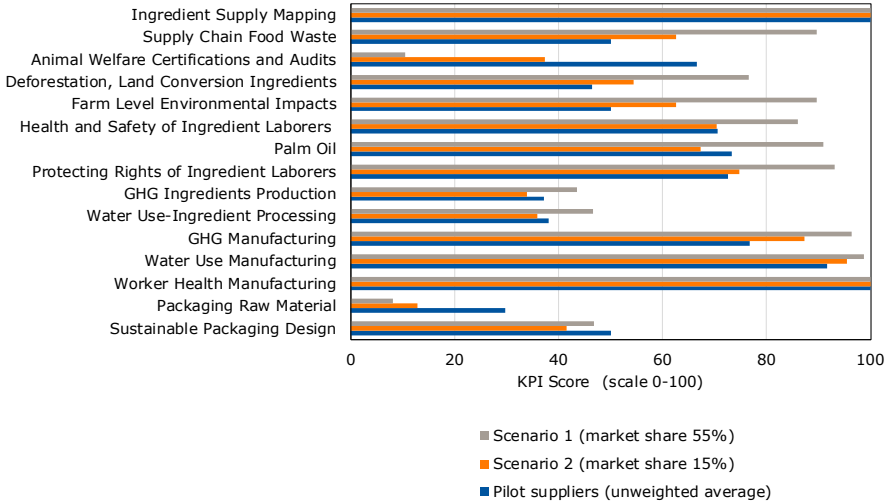

Figure 3.6 KPI scores (CIS-pilot unweighted and market share scenarios weighted) for tomato soup in the Netherlands, 2016
Source: own calculations based on TSC data.
Note: For producer A the results are aggregated based on 4 types of tomato soup: Organic Tomato – liquid; Organic Tomato – powder; Italian Tomato – liquid; Crème – powder.

3.3 Orange juice

Product & market definitions, market share scenarios

Market shares
CIS-pilot orange juice includes processed forms of oranges that contain 100% juice from one fruit entity. It doesn't cover other fruits or complex food products containing orange fruits as ingredients, for example, marmalade, concentrates, and fruit candy, as well as beverage mixes that contain less than 50% juice.

We are considering this product as a processed product because it undergoes several processing treatments like washing and producing juice concentrate which goes to final manufacturing facility that makes the final product.

The geographic market involves the Dutch domestic market at retail, wholesale and catering. This includes domestic and foreign produced orange juice. Total availability of orange juice on the domestic market is 87m euros (Figure 3.7).

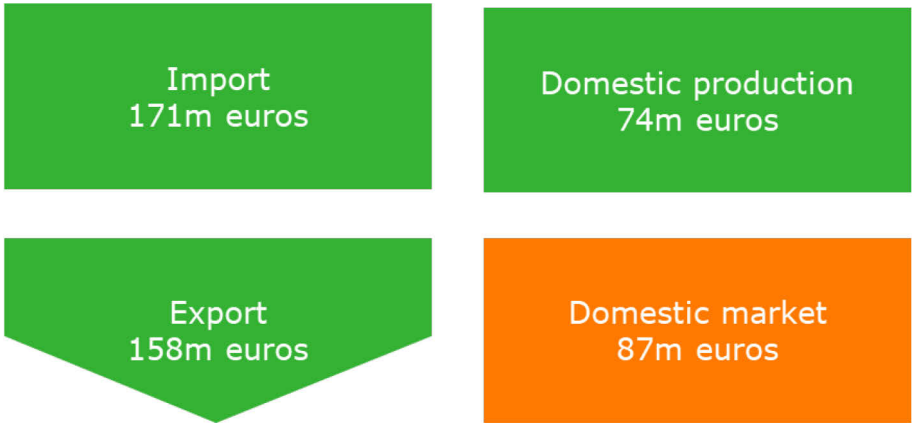

Figure 3.7 Import, export and domestic production of orange juice, 2016
Source: CBS.[6]

Market share scenarios

The total domestic production of orange juice in 2016 was 74m euros. This number corresponds to 85% of the total orange juice available on the Dutch market (Figure 3.7). Next to domestic production, only 8% of the imported orange juice may be available on the domestic market, because 92% of the orange juice imported by the Netherlands are not intended for Dutch consumers but are exported to other countries.

According to Euromonitor International the following 4 companies are the biggest orange juice producers in the Netherlands with about 54% retail value in 2016: Royal Friesland Campina (28,1%), Albert Heijn (16,3%), Bickery Food Group (5,2%) and Heinz (4,8%). Others count for 15,3%. The CIS-pilot surveyed 1 from the 4 biggest orange juice reducers listed above in addition to 3 other orange juice producers.

Scenario 1: Market share based on product category juice with a broad scope
The CIS-pilot surveyed 1 from the 4 biggest orange juice producers in addition to 3 other producers. The CIS-pilot surveyed juice made with oranges as the primary ingredient. Assuming that the survey results are representative for all types of juices produced by the 4 producers participated in the CIS-pilot, TSC could extrapolate these results to their total juice sold in the Netherlands. Their market shares in 2016 have to be no more than 31%. Figure 3.8 shows ammonised data of the four juice producers and the order in which they are displayed is random (Figure 3.8).

Scenario 2: Market share based on Euromonitor (brands) and annual reports
Based on Euromonitor data TSC estimated the brand market shares of the 4 juice producers in 2016. Assuming that the survey results are representative for the juice brands from the 4 participating producers, TSC estimates their brand market shares in 2016 to be no more than 10%. Figure 3.8 shows ammonised data of the four juice producers and their brands. The order in which they are displayed is random (Figure 3.8).

[6] **Domestic production** = Per 1,000,000 euros CBS code 10321220 Orange juice, not frozen, without alcohol, not concentrated
Import and Export = Per 1,000,000 euros CBS code 2009120000 Orange juice, unfermented, no added spirit, and if containing added sugar or other sweeteners with a Brix value of <= 20 at 20 ° C (excluding frozen juice).

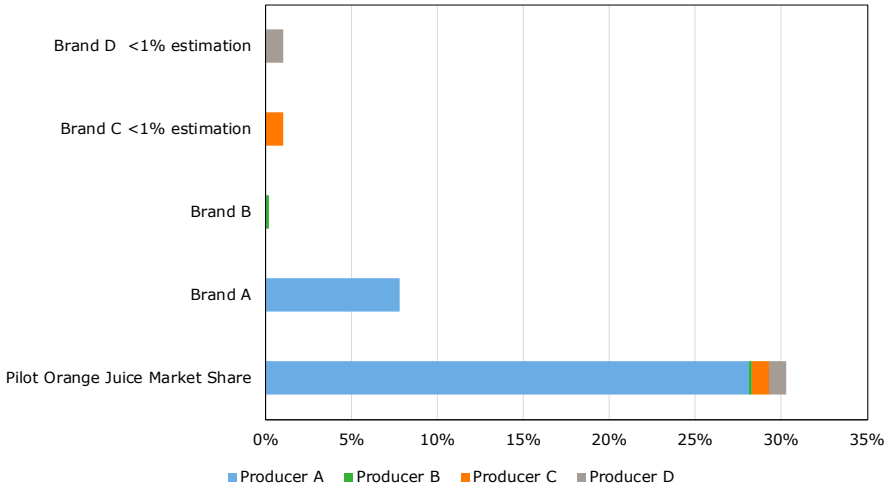

Figure 3.8 Market share of orange juice and branded orange juice market share in the Netherlands, 2016
Source: Euromonitor international.

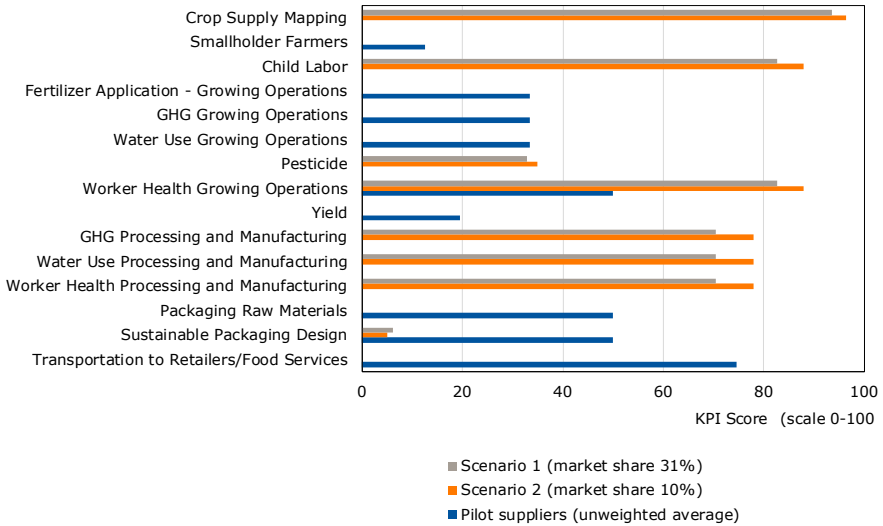

Figure 3.9 KPI scores (CIS-pilot unweighted and market share scenarios weighted) for orange juice in the Netherlands, 2016
Source: own calculations based on TSC data.

KPI customisation and suppliers KPI sustainability performance

The globally applicable TSC toolkit differs somehow from the toolkit used in the CIS-pilot. The main reason for this is a customisation of the CIS survey. As discussed in Section 2.1.1 the intent of such a customisation was to closely link the KPIs with national sector initiatives of the participating Dutch retailers and food services in the CIS pilot, and to improve the answerability and multi-year scalability of the TSC global toolkits in the Dutch situation in general.[7] The CIS-pilot supplier's results per TSC-KPI are converted in a KPI score and weighted by the supplier's market share scenarios to calculate national scores. Similar to the processed potatoes and tomato soup cases diversity in market share estimations may have significant impacts on a product's sustainability performance. KPIs with a high variety in responses given by the CIS-pilot supplier show opposite conclusions, depending on the market shares used to calculate a national total score (Figure 3.9). For your reference Figure 3.9 plots the unweighted average KPI scores of the CIS-pilot suppliers.

[7] See Appendix B for KPI customisations.

4

General conclusions and reflections

4. General conclusions and reflections

The goal of the CIS-pilot was to stimulate continuous improvement of sustainability of agro-products sold in the Netherlands. Next to that, the pilot focused on the feasibility for developing a national monitoring system that measures the sustainability performance of all food products sold in the Netherlands by using TSC pilot results from a variety of product categories and suppliers in the Netherlands.

In Netherlands there is a national sustainability monitoring for the food sector that measures consumer spending only on certified sustainable products (The Sustainable Food Monitor, in Dutch: Monitor Duurzaam Voedsel, MDV, Logatcheva et al., 2018). One limitation of the MDV is that it does not sufficiently reflect on all sustainability efforts other than third-party certification made by farmers, traders, processors, wholesalers, brand manufacturers, retailers and caterers.

We tested the TSC toolkits with a non-random selection of retailers and their suppliers of the following three product categories: processed potatoes, tomato soup and orange juice. A general conclusion of this analysis is that, the data gathered via the pilot could be a valuable source of data for expanding the current national monitoring system because it covers additional sustainability efforts that do not necessary lead to certification. The TSC approach presented here may guide governmental, non-governmental and private organisations broadly implement the TSC toolkits in the Netherlands which is currently not the case yet. However, the TSC approach will only work if it takes into account the issues the following issues:

- *Representability*
  The pilot suppliers were non-randomly selected and they were a mixture of small and large-scale suppliers and product categories that differed in scope which might potentially lead to (over)underrepresentation, which in turn might affect the market size estimations and the overall sustainability performance of a sector (see the case studies). Some KPI's can't be answered by all companies because the data is not available. Companies participate on voluntary base so a well-defined sampling framework that takes into account all relevant business characteristics (like size, type of supplier, product variety) is not possible. If the TSC system is broadly implemented however this risk of a non-representative sample, will become quickly smaller. Another way to deal with this problem, is to send out some additional surveys to companies that were not yet involved in the TSC pilot. If some large additional suppliers are included, representativity might quickly increase.
- *Weighting*
  Because suppliers may differ largely in size, reliable estimates of market share are important in order to get a balanced weighting. A quick scan of different approaches shows that this is not easily realised based on public sources. More research needs to be done to create reliable and consistent estimation of market shares.
- *Frequency*
  In the pilot, companies filled the toolkits only once. For a useful monitoring, it needs to be implemented on a regular basis (e.g., annually) to monitor performance. This relates again to the success that the TSC system will have in the Dutch market. If a broad set of companies are going to implement the system on a regular base, this problem will disappear.
- *Verification and validation of results*
  For any monitoring system, verification of results is important. In case of TSC KPIs, there is a potential bias of differences in interpretation by a respondent, deliberately filling in the most-desired response by a respondent, or the use of various tools with different calculation methodologies to calculate an answer. For the CIS pilot, all KPIs leave room for interpretation by the respondent. So, there is a possibility that suppliers do not differ in their actual performance, but still may have a different score. In the pilot, TSC-researchers verified the KPI responses provided by suppliers with interviews. That minimises the possibility of using different ways of interpretation of the KPIs, but it does not comprise a verification of

the results via an audit. Implementation of TSC, will profit from verification of responses but it could also significantly increase the costs.

- *Hotspot coverage*
  TSC KPIs are designed to support retailers/wholesalers/caterers to assemble data about their supply chain to discuss improvements with their direct suppliers. Some hotspots related to retail and consumer are out of scope within TSC or are only indirectly addressed through the way suppliers can influence these hotspots. If a TSC toolkit is used to assess the sustainability of a product category, additional metrics may be needed to quantify the latter part of the supply chain.
- *KPI customisation and linkages to national goals*
  In the pilot in the Netherlands some customisation of the globally applicable KPI's is done to align with national goals/sector initiatives. It is advised to use these adapted indicators also for the national monitor.
- *Administrative burden & best available data sources*
  A TSC toolkit assembles data on the most important hotspots through retailers, wholesalers and food service companies. In food supply chains, a majority of the hotspots occurs at farm-level. Farm-level sustainability data availability for retailers is sometimes low. In some cases, (public) data may be integrally, or through representative samples, assembled. These data are not linked to a retailer, however may give a robust insight in sustainability at farm-level, and potentially useful for a national monitor. This is however in most cases only the case if the product is produced by Dutch farmers. Using micro level data, like farm data, provides insight in variation among farms, identifies possible trade-offs, and best practices. Furthermore, making use or getting access to available data sources will decrease administrative burdens. Also for other parts of the supply chain, better quality data may be available and if so these data could be used in combination with toolkit responses or replace the toolkit responses.
- *Approval from suppliers*
  Suppliers that filled the toolkits, remain the owner of the data. They will decide for which purposes the data can be used.

References and websites

Boone, K, T. Ponsioen, M. Dolman, E. Georgiev, R. Helmes, F. de Ruijter, B. de Vos and S. de Vries, 2019. Continue verduurzaming van agro producten: Eindrapportage projecten Continuous Improvement of Sustainability in Dutch Food chains (2016) and Continuous improvement of Sustainability in Dutch agro-products chains (2017-18). Wageningen Economic Research, Rapport 2019-036. 50 blz.; 8 fig.; 3 tab.; 16 ref.

Consultancy.nl - http://www.consultancy.nl/nieuws/12473/de-top-100-grootste-familiebedrijven-van-nederland

Dutch Alliance for Sustainable Palm Oil, 2018. http://www.taskforceduurzamepalmolie.nl/

Dutch Dairy Association, 2018. (Nederlandse Zuivel Organisatie, NZO), https://www.nzo.nl/en/

Dutch Potato Processing Industry (Vavi) - http://www.vavi.nl/

Euromonitor International - Passport is a global market research database providing insight on industries, economies and consumers worldwide (https://www.euromonitor.com/)

Interbranch Organisation Arable Crops (in Dutch: Brancheorganisatie Akkerbouw) - https://bo-akkerbouw.nl/

Logatcheva, K, R. Hovens en W. Baltussen, 2018. Monitor Duurzaam Voedsel 2017 http://edepot.wur.nl/461277

Orbis - Orbis has information on around 300 million companies across the globe (https://www.bvdinfo.com/en-gb/our-products/data/international/orbis)

Statistics Netherlands (CBS) - https://www.cbs.nl/en-gb

TSC website, http://www.sustainabilityconsortium.org/

TSC, 2018. CASE STUDIES The Dutch Alliance for Sustainable Food Pilot. https://www.sustainabilityconsortium.org/impact/case-studies/dutch-alliance-sustainable-food-pilot/

TSC, 2017. Project Plan: Project PPS 2017-2018: Continuous Improvement of Sustainability of all agro-products sold in the Netherlands

Interimmanagementbureaus.nl - http://www.interimmanagementbureaus.nl/en/resume-id-86888-lang-NL.html

Wageningen Economic Research, 2018. Meerjarenvisie Monitor Voortgang Verduurzaming Voedsel, Project nummer: BO-43-002.01-002 https://www.wur.nl/nl/Onderzoek-Resultaten/Onderzoeksprojecten-LNV/Expertisegebieden/kennisonline/Meerjarenvisie-Monitor-Voortgang-Verduurzaming-Voedsel-1.htm

Appendix A General Definitions

Product Market Definition:

When determining the relevant product market, a distinction has to be made between the relevant product and its geographic market.

1. The relevant product market as is the market which includes all products and services which are interchangeable by the consumer in terms of their characteristics, prices and usage. In order to determine whether products are interchangeable the small but significant and non-transitory increase in price (SSNIP) test could be used to define the relevant market in a consistent way. SSNIP works as follows: suppose that a producer makes a small but justifiable price increase (e.g., 5-10%). Does this action lead consumers to adjust their buying behaviour and switching to another product so that the price increase becomes unprofitable? If the answer is positive, this product could be included in the relevant product market.
2. Relevant geographic market is the area within which the conditions under which the competition takes place are equal. Competition conditions may differ by geographic markets due to market structures, consumer preferences, regulations, or distribution network. Is a relevant product available to consumers in a different geographic area, or its provision can easily become active in another area, then those areas should be counted to the relevant geographic market.

Appendix B KPI Customisations

Processed Potatoes Case

CIS-pilot processed potatoes includes fresh or pre-baked products only due to their interchangeability by the consumer in terms of their characteristics, prices and usage. We are considering this product as a processed product because of its slightly processing and addition of one more ingredient (vegetable fat, e.g., palm oil).

For the CIS-pilot we decided to use the TSC Global Root Vegetables Toolkit as a basis, which we customised and added additional processing and packaging KPIs from the TSC Global Plant-based Foods Toolkit. Moreover, because vegetable oils are the second ingredient in processed potatoes we added to the survey the KPI Palm Oil, Palm Kernel Oil, and Derivative Ingredient Sourcing from the TSC Global Palm and Vegetable Oils Toolkit. Besides adding additional KPIs to the CIS-pilot survey we also modified the scope of some of the KPIs and made them better reflect the EU/NL situation. For example, we modified the TSC Global Soil Erosion KPI so it is answerable for the EU situation by combining its response options and adding EU soil erosion risk maps that can be used for the assessment and answering the modified KPI. For the Transportation to Retail KPI we added '(and Food Service)' to its scope because the CIS-pilot covers the caterers sector as well. Finally, we assessed various EU/NL/sector specific tools, certifications and initiatives and linked them to response options of applicable KPIs so the respondents can use them while answering these KPIs (table B1).

Table B1 Summary table CIS-pilot survey and KPI modifications

Added KPIs	Modified KPIs	
due to processed forms of the product	*due to scope CIS-pilot*	*due to EU/NL/sector specific tools, certifications and initiatives*
Palm Oil, Palm Kernel Oil, and Derivative Ingredient Sourcing	*Soil Erosion - Growing Operations*	*Some examples:*
Greenhouse Gas Emissions Intensity – Processing	*Pesticide Application - Growing Operation*	*European Soil Data Centre (ESDAC)*
Packaging Raw Material Sourcing and End-of-Life	*Transportation to Retailers/Food Services*	*QS. Quality scheme for food EU Organic*
Sustainable Packaging Design and Production		*MPS-Fruit & Vegetables*
		PlanetProof
		Zicht op CO_2 calculation tool
		Logistics Emissions Scan

Tomato Soup Case

For the CIS-pilot we decided to use 2 TSC Global Toolkits as a basis: Soup and Convenience Meals and the Complex Foods and Beverage Toolkits as a basis. We removed some KPIs due to possible double counting and issue relevance for soup (Animal Feed Productivity; Transportation to Retailers). Besides removing KPIs from the CIS-pilot survey we also modified the scope of some of the KPIs and made them better reflect the EU/NL situation. For example we modified all Processing and Manufacturing KPIs and made clear for the reader what we mean by Processing and Manufacturing. Finally, we assessed various EU/NL/sector specific tools, certifications and initiatives and linked them to response options of applicable KPIs so the respondents can use them while answering these KPIs.

Orange Juice Case

For the CIS-pilot we decided to use the TSC Global Citrus Toolkit as a basis, which we customised and added additional manufacturing KPIs from the TSC Global Juice Toolkit. Moreover, we added 3 more social KPIs to the survey based on TSC crop categories (Child Labour Use; Access to Opportunities for Smallholder Farmers; Worker Health and Safety - Growing Operations). The addition of these 3 social KPIs is because 3/4 of the orange juice sold in The Netherlands originates from Brazil and it is associated with serious social problems like unfair payments to the orange pickers and fruit growers and their exposure to toxic pesticides. These findings have been supported by research conducted by The Centre for Research on Multinational Corporations (SOMO). Besides removing KPIs from the CIS-pilot survey we also modified the scope of some of the KPIs and made them better reflect the EU/NL situation. For example, TSC Global Pesticide Application - Growing Operation KPI only asks for % of crop supply from growing operations that have a verifiable programme on good agricultural practices for the handling and use of pesticides. Many growers in EU/NL already have such a program. So, this does not result in much differentiation. Therefore, we defined 3 response options that increasingly focus at use and impact. We also added a response option for the % of organic production. Moreover, we modified the Processing/Manufacturing KPIs so they address these both activities into one KPI (e.g., Water Use Intensity - Processing and Manufacturing. For the Transportation to Retail KPI we added '(and Food Service)' to its scope because the CIS-pilot covers the foodservice sector as well. Finally, we assessed various EU/NL/sector specific tools, certifications and initiatives and linked them to response options of applicable KPIs so the respondents can use them while answering these KPIs.

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