BURLEIGH DODDS SERIES IN AGRICULTURAL SCIENCE

Protecting natural capital and biodiversity in the agri-food sector

Edited by Professor Jill Atkins, Cardiff University, UK

E-CHAPTER FROM THIS BOOK

burleigh dodds SCIENCE PUBLISHING

Natural capital and biodiversity accounting in the dairy industry: the case of Valio Group

Hannu Schadewitz, Turku School of Economics at the University of Turku, Finland

1 Introduction

The interest in sustainability is gaining increasing attention globally. Sustainable development is, '... development that meets the needs of the present without compromising the ability of future generations to meet their own needs' (Brundtland's Report of the World Commission on Environment and Development: Our Common Future, 1987). Sustainability has a substantial impact on firms because they are both major producers and consumers of resources and goods with significant resulting impacts on the environment and biodiversity. Consequently, firms can also play an important role in contributing to more sustainable societies and preserving biodiversity. The EU

http://dx.doi.org/10.19103/AS.2023.0128.08

Chapter taken from: Atkins, J. (ed.), *Protecting natural capital and biodiversity in the agri-food sector*, pp. 195–216, Burleigh Dodds Science Publishing, Cambridge, UK, 2024, (ISBN: 978 1 80146 351 5; www.bdspublishing.com)

Sustainable Development Goals (SDGs) in its 2030 Agenda include 'inclusive and sustainable economic growth', 'full and productive employment' and 'sustainable production and consumption patterns' as goals. The EU also has a biodiversity strategy for 2030 to protect nature and reverse the degradation of ecosystems.[1] Achieving these important goals requires the active participation of the business sector.[2]

This chapter reviews corporate reporting of natural capital and biodiversity within the dairy industry. The chapter focuses on the dairy industry as it is heavily dependent on extensive use of natural and animal resources. Milk is the central raw material for a wide variety of dairy products given its wide range of nutritional and functional properties (Huppertz and Vasiljevic, 2022). A primary concern at the very beginning of the production chain is animal well-being (McLaren and Appleyard, 2020). Since milk and products derived from milk are vulnerable to spoilage and pathogenic contamination and may have a limited shelf-life, the sector also needs a robust, well-managed supply chain from farm to processor and on to wholesalers and retailers. Production of dairy products thus represents a significant source of greenhouse gases (GHGs) across the supply chain. The carbon footprint created by the dairy industry is therefore a major global issue. The Intergovernmental Panel on Climate Change (IPCC) is the United Nations body established to highlight and assess science related to climate change.[3] The IPCC has described the ways the production of animal-sourced food emits GHGs, its contribution to climate change and also offers guidelines on policy to address this problem (www.ipcc.ch/srccl). However, it needs to be acknowledged that the impact of food production is more far-reaching than GHGs. Biodiversity and ecosystem impacts are critically important dimensions of sustainability which are linked to but also distinct from climate change (Kok et al., 2020).

A broader perspective on, and a greater insight into, the areas where the food industry has an impact on sustainability can be gained from consulting the Sustainability Accounting Standards developed specifically for the meat, poultry and dairy industry (Sustainability Accounting Standards Board, 2018). This standard covers ten sustainability disclosure topics with related accounting metrics. These topics are

- greenhouse gas emissions;
- energy management;
- water management;
- land use and ecological impacts;
- food safety;

[1] See https://environment.ec.europa.eu/strategy/biodiversity-strategy-2030_en.
[2] See http://ec.europa.eu/environment/sustainable-development/SDGs/index_en.htm.
[3] See www.ipcc.ch.

- antibiotic use in animal production;
- workforce health and safety;
- animal care and welfare;
- environmental and social impacts of the animal supply chain; and
- animal and feed sourcing.

As this list demonstrates, the impact of sectors such as the dairy industry is multidimensional and, in turn, highlights several areas where management needs to adapt their operations accordingly. Dairy firms are important actors in the production/manufacturing chain where consumer demand strongly steers the output manufactured. Dairy firms also have a high demand for raw materials, primarily milk. All this creates an important role for dairy firms and their sustainability and biodiversity impact in society.

This chapter begins by looking at ways of studying business sustainability practices, both in terms of external pressures and, in particular, internal processes within individual businesses. It then focuses on the Valio Group as a case study. The chapter reviews general findings from in-depth interviews with senior Valio staff. Subsequent sections look at key interview themes related to how a sustainability agenda is pursued in Valio: disciplined corporate governance, market-driven product development, science-based sustainability targets, sustainable dairy farming, stakeholder/consumer-oriented communication and UN SDGs.

2 Ways of studying business sustainability practices

Prior research has placed great emphasis on sustainability reporting as a driver for organizational transformations towards a more sustainable approach. However, scholars note a failure to produce the desired organizational change (Thomson, 2014). Hence, a more comprehensive approach to examining sustainability within business organizations is called for. We need to understand better how sustainability is emerging within firms at both strategic and operational levels and how those levels interplay.

This section aims to address two research objectives to provide insight into how sustainability is approached in the Finnish dairy industry (see also Table 1):

1 How do the institutional (external) pressures imposed by environmental, social and governance (ESG) practices affect the strategies, organization and supporting systems of Valio?
2 How do the internal pressures imposed by ESG practices affect the strategies, organization and supporting systems of Valio?

Table 1 Research objectives, methods and data

Objective 1. Institutional (external) pressures influence on strategies, organization and supporting systems Methods: archival search, interviews. Data: regulations, SASB standard, recommendations, governance guidelines, Valio, interviews.
Objective 2. Internal pressures influence on strategies, organization and supporting systems Methods: interviews, analyses of firm's external documents. Data: Valio, interviews.

Sustainability practices have been mostly examined through the lens of legitimacy and stakeholder theories (Yang et al., 2015). Our first objective is understanding the external factors affecting Valio's sustainability. Objective 1 approaches the subject from an institutional (external) viewpoint. It involves characterization of institutional contexts, such as regulations and recommendations, corporate governance guidelines and potential reporting requirements regarding sustainability. This analysis is required to understand the context in analysing Valio's approach to sustainability (see also Senn and Giordano-Spring, 2020; Farooq and de Villiers, 2019).

As indicated in Objective 1, compliance can be related to the institutional setting, e.g. compliance with legislation or internationally/nationally recognized certification schemes. Relevant schemes Valio has committed to include ISO 14001 environmental certification, ISO 9001-certified quality system, FSSC 22000-certified food safety control system, self-monitoring plans compliant with HACCP guidelines (HACCP refers to Hazard Analysis Critical Control Point), accredited laboratories, Sedex (Supplier Ethical Data Exchange) membership and compliance of emissions to air calculations with the guidelines of the international GHG Protocol (www.ghgprotocol.org). In addition, milk and product purity is verified through stricter residue control than is required by law. (Sustainability Report 2020). The milk and product purity requirement at Valio is one example of how Valio has set the bar higher than required by the institutional setting (in this case legislation). Appendix 1 lists sustainability reporting regulations and recommendations in Finland relevant to Valio.

Objective 2 is more firm specific and looks at the firm's internal structure in relation to sustainability. Political, economic, legal, cultural, ideological, organizational and personal factors can affect how a firm undertakes sustainability activities. Prior research on determinants for corporate sustainability has almost exclusively focused on external reporting, leaving aside other important practices. However, external reporting is vulnerable to business concerns regarding reputation and image. Cooper and Owen (2007) have also suggested weaknesses in the links between those managing firms

and external stakeholders. Those factors can bias external reporting. Internal practices, sustainability and accounting systems can be more meaningful for successful implementation of sustainability inside a firm. Analysing firm practices and related internal pressures can thus provide additional insights. These factors can be captured by interviews (see Hofman et al., 2017). The chapter analyses whether internal, sustainability-related pressures affect strategies and organization. This area is less well researched.

To study sustainability attitudes and systems within Valio itself, it is not be possible to collect quantitative data, as there are no publicly available data and no databases available. As a context, the author used relevant official data and articles, such as Hofman et al. (2017), Kautto (2001) and Marquis et al. (2011). However, interviews were used as a key tool to gain an understanding of what external and internal pressures influence managers' decisions regarding promoting sustainability at strategic, organizational and supporting system levels. Besides answering the 'what' question, this chapter answers also the 'how' question, i.e. ascertaining how those pressures are factored into strategies, organization and supporting systems within Valio.

Data were collected using semi-structured interviews. Interviews helped to map out general issues and identify key sustainability issues in response to research questions. The interview guide is shown in Appendix 2. It should be pointed out that the interview guide contains a few questions related to China. These questions are related to another project and are not used for this chapter. Interviews were targeted at managers responsible for sustainability issues. Interviewees were selected from three levels: strategic (e.g. executive board membership), organizational and supporting systems.

3 Case study: Valio Group

To gain a better understanding of the factors affecting dairy firms' approach to sustainability and sustainability (including biodiversity) accounting, this chapter focuses on one firm headquartered in Finland: Valio Group (henceforth Valio). Finland is a Nordic country, a member of the EU with a population of 5.5 million. As a country, Finland has been at the forefront of sustainability and biodiversity since concerns about sustainability and biodiversity arose (Sachs et al., 2021).

Valio was established in 1905 and is now the largest dairy firm in Finland with a workforce of 3500, processing roughly 1.8 billion litres of milk per year. It is a brand leader in Finland and also a significant player in the international dairy ingredients market. The company has subsidiaries in Sweden, all the Baltic countries, the USA and China. In 2020, Valio's net sales were 1.8 billion euros. Valio's exports from Finland account for about 25% of Finland's total

food exports. Valio conducts intensive and successful product development: it holds over 300 patents in 50 countries.

Valio has a foundation as a cooperative: it is owned by dairy farmers. More specifically, it is owned by a group of regional dairy cooperatives (with a total of 13 shareholders) comprising some 4000 Finnish dairy farmers. Valio pays out all its profits to its member farmers through these regional dairy co-operatives. This means Valio can source locally produced milk with a clearly identified origin. The non-listed position of Valio also releases it from certain reporting requirements for listed firms and also from certain market pressures. Recent research by Allen, Lewis-Western and Valentine (2022) has shown that the burden of financial regulation can reduce research and development (R&D) spending and innovation. Allen et al. (2022) show that the consequences can also be a less innovative organizational culture. As a non-listed firm, Valio can bypass some of the regulatory reporting requirements for listed firms and seems to prefer more tailored, non-regulated forms of interaction with its stakeholders. Consistent with Allen et al.'s (2022) finding is the conclusion that flexibility in corporate reporting can sometimes support more R&D and innovation.

Valio is recognized, amongst other things, for its high-quality products, R&D innovation as well as its responsible production chain. Valio has achieved first place eight times in a row (years 2014–21) in Finland's most sustainable brand survey.[4] As this suggests, Valio has a high level of ambition in the area of sustainability, as shown in its 2020 Sustainability Report (p. 9): 'Our vision is to be the leader in innovative dairy and food solutions. Innovativeness is visible not only in product development but also in all the other activities we do'. The 2020 Board of Directors' Report specifies the vision further (p. 2): 'Valio's strategy was updated in 2020. Our vision is to be the world's most innovative dairy and food company'.

Valio has listed the following eight focus areas in its 2020 Sustainability Report:

- Regenerative agriculture;
- Circular operations;
- Emission reductions in farming and milk production;
- Biodiversity recovery;
- Animal welfare;
- Sustainable solutions for customers and society
- Environmentally smart packaging; and
- Innovations for well-being.

[4] See Sustainability Report 2020, link to sustainable brand survey https://www.sb-index.com/finland.

Valio applies Global Reporting Initiative (GRI) Standards in compiling its annual sustainability report. However, the report is not assured externally.

Three interviews were conducted in Valio with a total time spent of 4 h and 5 min. The first interviewee was the Senior Vice President – Group Sustainability (henceforth SVP – GS). The interview was conducted on 8 October 2020 with a duration of 69 min. The SVP – GS had a BA in business and administration and had also participated in several executive education courses covering such areas as management, digitalization and leadership. She had worked in Valio for over 30 years in various positions in different markets (countries), starting as an assistant in market research. The SVP – GS's duties focused on various marketing and brand-related responsibilities. With that background she had taken on her current sustainability role. This position was intentionally designed for a person with a marketing and brand background to help create a relative competitive edge. The purpose of the role is to integrate brands with actions promoting sustainability.

The second interviewee was the Executive Vice President – Sustainability and Stakeholder Relations (henceforth EVP – SSR). This interview was conducted on 26 August 2021 and lasted 86 min. The EVP – SSR is a lawyer with various responsibilities at Valio. She also had a MBA and had studied abroad. Her background is a business lawyer in non-listed firms. She had worked for around 20 years in various legal-oriented positions at Valio. Nowadays the EVP – SSR has six main areas of responsibility (each with a director reporting to her: sustainability, stakeholder relations, carbon-neutral milk chain, primary production, legal matters and group communication). EVP has been in her current position for almost 4 years. Previously she was director of legal matters, including responsibility for compliance matters. A more strategic orientation to sustainability and its management has been in place from 2018 when a carbon-neutral milk chain was developed.

The third interviewee was the Senior Vice President – Group Communications (henceforth SVP – GC). This interview was conducted on 12 October 2021 and lasted 90 min. The SVP – GC has an M.Sc. in business studies majoring in business communication. The SVP – GC's professional duties have focused on communication including sustainability issues. SVP has worked in Valio for about 4 years and in the current position for over 1 year.

4 Findings from interviews with senior Valio staff

In general, it can be said that all three interviewees were very uniform regarding their communication about sustainability matters and their importance in Valio. This is one indication that the overall roots of a sustainability culture in Valio are established and solid.

It is fair to start with a recognition of Artturi Virtanen, Professor of Biochemistry, and his fundamental and long-lasting role in Valio, as characterized by the SVP – GS:

> *At the time Virtanen was awarded Nobel Prize in Chemistry and he led our product development roughly 50 years and somehow his spirit lives on the walls of Valio and in the souls we feel passionate about product development. We continuously develop new products and new practices.*

The Nobel Prize in Chemistry in 1945 was awarded 'for his [Virtanen´s] research and inventions in agricultural and nutrition chemistry, especially for his fodder preservation method'. (https://www.nobelprize.org/prizes/chemistry/1945/virtanen/facts/). Specifically: 'Access to nutritious food year-round, especially in countries with cold winters, requires that the nutrients in food are preserved. Artturi Virtanen studied the chemistry of nutrients, including that in processes for dairy products. In 1932 he developed a method for better preserving the nutrients in the hay. Using hydrochloric and sulphuric acids, he impeded certain processes, preserving the grass´ proteins and vitamins. This helped cows produce more nutritious milk year-round without imported fodder'.

The first theme that emerged from SVP – GS was the importance of the competitive advantage of brands and how this advantage could be strengthened through sustainability. The SVP – GS emphasized that Valio is actively investing in sustainability even though the general public may not necessarily be aware of the sustainability issues. The name Valio can be translated into English as 'premier' or 'champion', indicating that, from the beginning, Valio has targeted high-quality products. Valio began by exporting Finnish butter to the UK which required high-quality products to ensure competitiveness. Finland's reputation for product safety and quality is well recognized and valued by customers, especially in China. A commitment to sustainability helps to reinforce this image.

Another theme that came up with the interview with the SVP – GS was disciplined corporate governance (henceforth CG). CG is the system by which a company is directed or controlled, including designation of appropriate responsibilities. Valio has a matrix organization with clear functional responsibilities, e.g. designated managers for functions such as Energy, Logistics and Packaging, There is, e.g. a designated senior vice president for the company's Carbon-Neutral Milk Chain Project. This is one indication of the commitment at Valio to sustainability and carbon reduction and, ultimately, elimination of carbon emissions.

The interview with the EVP – SSR reinforced the degree of cohesion and coherence on sustainability matters taking place at Valio. Examples include a traffic lights system, periodic sustainability forums and an initiative/innovation reward system. A traffic lights system provides a monitoring tool for all strategic

projects. The green light indicates that the phase of the project is proceeding to plan, the yellow light indicates that the project requires additional attention and the red light indicates that the project is delayed and needs corrective actions.

The EVP – SSR also identified pressures from stakeholders in relation to sustainability, particularly consumers and farmers. Consumers are showing a greater interest in sustainability. Dairy farmers, in turn, are concerned about making their living and how sustainability requirements affect profitability. Communication issues with stakeholders will be discussed later in the chapter.

The SVP – GC emphasized the importance of management commitment to spread the sustainability theme within Valio. Practical tools to support this include mandatory digital courses for staff, forums, development discussions and specialized teams. The SVP – GC emphasized the importance of the whole production chain from field to end product, especially dairy farms. In terms of biodiversity, there are surveys and consultation visits to some farms by professionals related to biodiversity. Those visits assist dairy farmers in developing biodiversity best practices which are also communicated to other contract dairy farmers. Besides a focus on climate change and biodiversity, well-being and health are strongly emerging themes at Valio.

5 Interview themes: disciplined corporate governance and global-oriented market-driven product development

Sustainability is a multidimensional theme in an organization. As the EVP – SSR commented, 'doing right' is not always a strong enough argument supporting sustainability. There need to be stronger arguments for owners and top management to commit to sustainability. These include political pressure and consumer attitudes.

Well-structured and disciplined corporate governance is essential to achieve corporate objectives. In interviews, themes such as a matrix organization, use of professional teams and cooperation inside the organization and with outside stakeholders were emphasized. Besides logical governance structures and a commitment of management to sustainability, sustainability needs to be communicated through the organization and to farmers.

Disciplined CG can be seen in the company's annual activity clock which coordinates forums, monthly meetings and other events for relevant people to meet frequently. Sustainability forums are organized three times per year. Those forums serve as a platform for top management to present and review strategically important sustainability matters and their progress. Other examples include translating the company code of conduct into language employees can

understand and related mandatory web-based courses. Valio has also a brand manual supporting and guiding brand-related work.

The SVP – GS works closely with the logistics director and packaging development director. She also works closely with the EVP – SSR. When e.g. renewable energy issues need to be discussed, the SVP – GS coordinates with the corporate energy director. Valio is organized as a matrix where thematic professional teams have an important role. Those teams are organized around key areas. Whilst the SVP – GR has overall responsibility for sustainability, she leads and helps to coordinate other teams that connect with sustainability. A company code of conduct helps to support teamwork. The company also has a well-designed intranet which provides an important communication channel. The SVP – GS and fellow experts are constantly seeking the right approaches where Valio has or could build competitive advantage, such as the Carbon-Neutral Milk Chain 2035 Programme.

5.1 Market-driven product development

A major external factor having an impact on product portfolio is market demand. Valio sells products to both private consumers and industrial customers (hotels, restaurants and catering – HoReCa). Market trends are monitored very intensively at Valio. The SVP – GS highlighted the importance of sensitivity to customer needs. The largest retailers and industrial customers in particular provide valuable information on consumer attitudes. There are also sustainability projects shared between Valio and its retailer customers. Valio also has a Consumer Insight Department that follows global market trends and carries out consumer research. Two examples of market-driven developments mentioned by the SVP – GS are lactose-free products and plant-based products. Valio's lactose-free technology is very advanced and highly valued abroad. The company's plant-based products category is a rapidly developing area in line with growing demand (regarding the potential for reducing climate impact and preserving biodiversity by producing oat-based milk (instead of cow's milk) (Röös et al., 2016)).

Finally, the SVP – GS emphasizes the importance of active dialogue between Valio and its customers. This dialogue is facilitated via the use of social media channels, consumer service operations, Valio's web pages, meetings with stakeholders and an active media presence. Enquiries directed to the consumer service team are, e.g. valuable in understanding consumer sustainability attitudes. The EVP – SRR also mentioned that Valio conducts systematic media watching activities. She stated that Valio wants to be active in discussions instead of being a bystander.

6 Interview themes: science-based sustainability targets and sustainable dairy farming

Science-driven decision-making is key to Valio regarding sustainability issues. The environmental impact of the dairy industry is multidimensional and measuring its impacts is challenging. A science-based approach is required to measure those impacts and to set appropriate science-based targets (SBTs). Valio sets climate targets aligning with the Paris Agreement (https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement). This agreement 'is a legally binding international treaty on climate change. It was adopted by 196 Parties at COP 21 in Paris, on 12 December 2015 and entered into force on 4 November 2016. Its goal is to limit global warming to well below 2, preferably to 1,5 degrees Celsius, compared to pre-industrial levels'.

Valio's climate impact in 2020 was as follows (Sustainability Report 2020). GHG emissions from its operations in Finland were 2.3 million carbon dioxide equivalent tonnes (Mton Co_2eq).[5] The vast majority (79%) of GHG emissions originated from raw milk. Energy use at plants accounted for 7%, and logistics for 2%. Other emissions were related to other raw materials used in product manufacturing, packaging and waste processing (Sustainability Report 2020). The SVP – GC commented that the emission-reducing actions are targeted especially at functions causing most emissions. Some examples of these mitigation actions are described next.

The main example of emissions reduction is the Carbon-Neutral Milk Chain 2035 Programme which includes specific SBTs to track progress. Valio's climate programme involves collaboration between Valio, its dairy farms, agricultural and energy sector companies, and research institutes. Research institute partners include VTT Technical Research Centre of Finland, the Natural Resources Institute (Luke) and the University of Helsinki. Part of Valio's SBT setting process is an emission inventory using the International Greenhouse Gas Protocol (https://ghgprotocol.org/). The carbon footprint of raw milk has been calculated using Valio's lifecycle calculation model, certified in 2019 by the Carbon Trust (https://www.carbontrust.com/).

6.1 Sustainable dairy farming

In addition to innovative product development, the slogan 'Valio owned by farmers' has also helped to create a positive corporate image. According to the SVP – GS, this underlines the view that money is not the number one priority in Valio's operations. The carbon footprint of raw milk is also a highly important

[5] The computation followed the calculations guidelines of the international GHG Protocol (www.ghgprotocol.org). Renewable energy's Direct emissions are not calculated as emissions in the inventory, i.e. computationally, they are zero.

measure. Valio's carbon footprint is split as follows. Primary production on farm is responsible for 93% of the firm's carbon footprint:

- 49% from cows' rumination (methane);
- 26% from feed crop cultivation (nitrous oxide);
- 6% from energy use on farms (mainly carbon dioxide);
- 4.5% from fertilizer production (carbon dioxide);
- 4.5% from manure handling (methane and nitrous oxide); and
- 3% other inputs.

Beyond the farm:

- 5% is from logistics and factories (3.5% energy use at factories; 1.5% logistics); and
- 2% is from packaging.

Valio is making an ongoing effort to reduce its carbon footprint in all these areas with the ultimate target of achieving a carbon-neutral milk chain by 2035. It should be mentioned that all dairy farms are included in Valio's sustainability bonus programme (which rewards farmers for implementing sustainability practices) from the beginning of 2021. According to the SVP – GS, all dairy farms approved to supply milk to Valio must belong to the bonus programme.

One way to reducing the carbon footprint is feed additives that reduce methane emissions from cows. Valio and the Dutch company DSM have collaborated to find opportunities to utilize a new additive that can reduce methane emissions from cattle by about 30%. (Sustainability Report 2020). It should also be mentioned that imported soy as feed is forbidden in the Valio Group (Sustainability Report 2020).

Besides sustainability issues related to GHG emissions and climate change, farming also has an impact on biodiversity (Kok et al., 2020). The SVP – GC noted that biodiversity experts from the Rural Women's Advisory Organization https://www.maajakotitalousnaiset.fi/english have conducted dozens of visits to dairy farms. Together with farmers, these experts have looked for areas of existing high natural value, potential areas for biodiversity enhancement and targets to monitor progress. The organization offers, among other services, environmental landscape management services (Sustainability Report 2020; for biodiversity indicators and tools for evaluating biodiversity – see Sizemore, 2015).

In addition, during the summer of 2020, indicator species in agricultural environments were monitored as a joint project with the Finnish Biodiversity Information Facility (FinBIF) at the University of Helsinki (Sustainability Report 2020, link to FinBIF https://laji.fi/en). As its website states: 'FinBIF is an open

access data repository for researchers, government, and the public. FinBIF consolidates many collections and datasets of living Finland in a single source. Our online portal, laji.fi, allows you to browse, search and download information about all forms of biological life, and to record and share your observations. FinBIF is committed to the sharing and promotion of open access data'.

Farmers have received hands-on advice on how to support biodiversity on their farms. This advice has then been distributed in various ways (such as magazine articles, videos and electronic learning platforms) to other dairy farmers as well. According to Valio Sustainability Report 2020, the best ways to secure biodiversity are related to carbon farming practices, organic milk production and grassland grazing of dairy cattle. Sustainability Report 2020 states also that several of Valio's climate programme measures support biodiversity (on harnessing biodiversity for healthy dairy farms, see Zhang et al., 2022).

According to the Sustainability Report 2020, Valio is leading the CARBO® project that focuses on regenerative agriculture. One result of the project is Valio's CARBO® environmental calculator. This gives dairy farmers precise information about environmental impacts of a farm's raw milk production. As noted, the Carbon Trust has certified the calculation model. The model is based on IPCC's recommendations, the European Commission's Product Environmental Footprint Category Rules (PEFCR) and Valio's long-term scientific work. Training is available for farmers to use the environmental calculator. Information regarding a farm-specific baseline and emission sources helps to target measures for reducing emissions more accurately. (Sustainability Report 2020). The CARBO® project has been a factor in Valio seeking independent Gold Standard certification (https://www.goldstandard.org/, Sustainability Report 2020).

According to Valio, a key challenge in cutting milk's carbon footprint is the draining of wetlands or peatland forests over decades (Sustainability Report 2020). Draining of peatlands and peat extraction releases carbon dioxide into the atmosphere. In 2020, these releases were measured at four Valio dairy farms in a project called climate change mitigation in organic soils on cattle farms (OMAIHKA). More project information and its stakeholders (such as Valio and Ministry of Agriculture and Forestry of Finland) are available from Natural Resources Institute Finland Luke at https://www.luke.fi/en. As an example, there has been research into using grass as a perennial crop on the surface of peatland to provide a more effective way to reduce emissions, compared to annual grain production. CARBO® seed mixes are another way to improve carbon sequestration in grasslands. The mix includes clovers, which help pollinators, as well as grass species that are more resistant to abiotic stress and improve soil structure. Five different seed mixes are available (Sustainability

Report 2020). These seed mixes are an important and practical way to support natural capital and biodiversity.

7 Interview themes: stakeholder/consumer-oriented communication and UN Sustainable Development Goals

The SVP – GS recognized that Valio's sustainability actions and reporting does not always gain enough attention and recognition from the general public. This is an issue which affects other larger dairy firms (Sun and Lange, 2023). One recent high-profile project Valio has participated in is the SIHTI Project initiated by the Ministry of Economic Affairs and Employment which assesses the human rights performance of Finnish companies (Tran-Nguyen et al., 2021).

Since dairy farmers own Valio, this stakeholder group is crucially important in terms of communication. Dairy farmers fear that sustainability requirements create an additional burden for farming without related economic benefits. The EVP – SSR pointed out the importance of convincing dairy farmers in committing to sustainability issues. A message focusing on 'doing right' is insufficient. There needs to be an understanding of factors such as economics, political pressure, consumer behaviour and competition. Dairy farmers need tailored communication and targeted communication channels which reflect farmers' specific needs. The SVP – GC also highlighted Valio's key role in safeguarding farmers' interests in Finland's agricultural policy. She highlighted the importance of making decision-makers aware of Valio's work in promoting sustainability in co-operation with farmers.

Communication for consumers is very important as well. Similar communication challenges exist with consumers as with decision-makers. The SVP – GC stated that Valio aimed to develop its communication to reach consumers as far as (grocery) store level with a focus on product-specific sustainability information. The EVP – SSR discussed the possibility of bringing sustainability issues more explicitly into financial reporting. One example that was mentioned was the carbon emissions adjusted Earnings per Share (EPS) figure.

7.1 UN Sustainable Development Goals

Valio has selected eight out of 17 SDGs as most relevant to its operations. These are:

- SDG 2 Zero hunger;
- SDG 3 Good health and well-being;
- SDG 8 Decent work and economic growth;

- SDG 10 Reduced inequalities;
- SDG 12 Responsible consumption and production;
- SDG 13 Climate action;
- SDG 14 Life below water; and
- SDG 15 Life on land.

Two SDGs discussed in more detail here (and particularly relevant to biodiversity) are:

- SDG 14 Life below water; and
- SDG 15 Life on land.

Valio's commitment to SDG 14 is focused to promotion of a 'Circular economy in primary production, reducing effect on water system (COD, Chemical Oxygen Demand)'. SDG 14 is an especially relevant goal because Finland has approximately 187 000 freshwater lakes within its borders. One of Finland´s nicknames is the 'Land of Thousand Lakes'. Turning to SDG 15 Valio focuses on 'Animal welfare, promoting biodiversity at dairy farms'. Valio has a biodiversity roadmap and targets. Animal welfare is promoted in part through a sustainability bonus scheme (2 cents per litre) which Valio wants all farmers to commit to by 2020, as well as planning a welfare index for dairy cattle.

Valio has also worked with other partners to promote sustainability. Initiatives include carbon farming training with the Baltic Sea Action Group (BSAG). Valio helped to develop BSAG´s E-College for regenerative agriculture. This is a free, science-based online course on regenerative farming. As mentioned earlier, Valio led the CARBO® project in collaboration with several preeminent research groups: Finnish Meteorological Institute, Natural Resources Institute (Luke), University of Eastern Finland, Yara and Atria Tuottajat. It has also supported R&D projects focused on carbon sequestration in grasslands and the efficiency of grassland farming.

The previous discussion of Valio's approach to sustainability also shows its choice of other SDGs. SDGs 2 and 3 are related to the availability of food. SDGs 8 and 10 relate to key Valio stakeholders: 8 to dairy farmers that are owners of Valio and 10 to employees and their equal treatment. SDG 12 strives for responsible consumption and production. Finally, SDGs 13, 14 and 15 goals relate closely to dairy farming. Farming should be done in a way that takes biodiversity into account. Use of fossil fuels can be reduced by using technology to convert waste and manure to energy, e.g. with biofuel replacing diesel in milk trucks.

8 Conclusion

The statement of SVP – GS 'sustainability in all actions and all markets' captures well Valio's intentions regarding sustainability. Valio's scientific roots are strong and deep and targets are set high. These roots go back to Professor A. I.

Virtanen who helped cows produce more nutritious milk year-round without imported fodder. Professor Virtanen's scientific heritage laid the foundation for scientific innovation to be valued at Valio.

Well-functioning CG has been a key element in Valio's approach to sustainable development throughout the production chain (from field to table). All three interviewees highlighted the importance of good CG and clear allocation of responsibilities. Teamwork in a matrix structure is also important. Expert work in teams is indispensable because sustainability issues in the dairy business are diverse and call for specialized solutions. Collaboration between Valio, universities and other expert organizations is intense, fruitful and productive. All this suggests that Finland provides a good base for the dairy industry to improve its sustainability and promote biodiversity. One indicator supporting this is Finland's number one position in the international sustainable development comparison of the 193 countries ranked (Sachs et al., 2021). The annual ranking is by the UN and the Bertelsmann Foundation. The ranking assesses countries' progress in implementing the 2030 Agenda for Sustainable Development and its SDGs.[6]

Valio's strong CG together with Finland's favourable sustainability regime offers a suitable framework facilitating sustainability developments. An important part of good CG is committed personnel and good communication. Valio follows an annual clock, has frequent forum meetings, has other frequent meetings and has various other communication channels to ensure adequate information flow within the organization.

Valio is an active player in its field. It listens carefully to markets, tries to pick up megatrends in consumption, is an active participant in relevant discussions and also communicates actively with government and other decision-makers. Stakeholder theory and legitimation theory help to explain Valios's performance (Deegan and Unerman, 2006). Valio's sustainability actions are in line with stakeholder theory. Legitimation theory helps to explain Valios's approach to communication with decision-makers.

Last but not least is Valio´s co-operative structure through which Valio is owned by dairy farmers. Thanks to this ownership structure Valio can avoid a more short-term approach. Valio's target is to be profitable and to pay all operating profits to owners. Dairy farmers are fundamental both in terms of ownership and rootstock of raw material. These roles make dairy farmers a special stakeholder group among all other stakeholders.

This chapter has some caveats. Even though the persons interviewed were highly experienced and had a thorough knowledge of Valio Group, a larger number of interviews would have given additional insight into some of the more specific areas discussed. One important theme to investigate further is

[6] https://valtioneuvosto.fi/en/-/10616/finland-ranks-first-in-international-sustainable-development-comparison.

the Carbon-Neutral Milk Chain Project. This project is led by the senior vice president, highlighting the importance of this flagship project, which was also confirmed by all three interviewees. It would also be particularly useful to analyse how financial reporting could be enriched by integrating carbon-related information. One such example, indicated by the EVP – SSR, could be emission-adjusted milk price per litre that Valio pays to farmers. Currently Valio publishes two separate reports (which separate sustainability and financial information):

- Sustainability Report
- Board of Directors' Report and Financial Statements

Conventional accounting and its communication could benefit by taking sustainability information more into account, e.g. as alternative performance measure figures. That would, in turn, assist stakeholders to recognize better the economic effects of sustainability actions.

Valio's selected eight SDGs would be a fruitful area for a deeper examination from an accounting integration perspective (Gunarathne et al., 2022). In addition, one future research area in accounting could focus on how complicated sustainability matters could be most effectively and most distinctly communicated to stakeholders. From a more economic perspective, it would be advantageous to stakeholders if sustainability and economic data could be more integrated. Enhanced integration, in turn, would help stakeholders to take the economic effects of, say, environmental resource allocations better into account. Overall, more research identifying natural capital and biodiversity accounting tools to support integrated reporting is called for.

9 Acknowledgements

The interviewees at Valio are acknowledged for their time and expertise facilitating the realization of this chapter. Professor Jill Atkins has offered useful comments in various phases of this chapter, for which I am most grateful. I would also like to acknowledge Joona Haavisto and Valtteri Toivanen for transcribing the interviews. I gratefully acknowledge the financial support of the Foundation for Economic Education. The author retains responsibility for the final interpretations.

10 Appendix 1 Regulations and recommendations related to sustainability for Valio

In Finland according to Accounting Act 3a§ requirement to report nonfinancial information does not apply to non-listed firms. The only exception is information given in the review of operations. Information should be given in the review

of operations if it has significant economical relevance and is related to environmental and personnel matters.

On the voluntary sustainability reporting firms could have certain contracts they are committed to following. For example, those firms that have signed the Global Compact agreement have committed to report annually. That reporting can be done by following the Global Reporting Initiative (GRI) format or constructing a more tailored, firm-specific, format instead. There could be also other contracts such as energy-efficiency contracts. Those contracts could contain responsibilities to report about progress for contract parties and possible also more widely. These specific contracts do not include a requirement for sustainability reporting. The dairy industry as such does not require sustainability reporting. However, in Finland in the food industry, there exists agreed general principles and recommendations for reporting. For example, the Finnish Food and Drink Industries' Federation has published self-monitoring instructions (HACCP guidelines, Hazard Analysis Critical Control Point) tailored also for the dairy industry (link to Finnish Food and Drink Industries' Federation https://www.etl.fi/en/index.html).

11 Appendix 2 Interview guide for representatives of the Finnish company

The interview guide needs some adjustment to each interviewee background – this is a general guide only.

Preamble

- Introduce myself/ourselves.
- Our research: We are interested in firm sustainability. We try to figure out firm's sustainability orientation, sustainability systems and sustainability communication to firm stakeholders.
- Anonymity/confidentiality.
- General concept (definition) characterizing firm sustainability: definition of sustainability. The quality of being responsible to the economy, society and environment or not depleting economic, societal or natural resources, thereby supporting long-term economic, societal and ecological balance.
- The translation of sustainability in Finnish might work using the term responsibility 'vastuullisuus' among businesspeople.
- Is recording OK?

1. Demographic information

- What is your educational background?
- What is your professional background/career
- Position in the company
- Current job in the company

Prior experience

- Years of experience in the current position and in the company
- Do you have any experience in China?
- Have you worked in countries other than Finland? What kind of experiences have you had there?

2. Sustainability overview

- How would you characterize your company in terms of sustainability?
- How does sustainability affect your work?

3. Sustainability at the strategic level in the company

- What is the role of sustainability in the strategy of the company?
- How has sustainability at the strategic level emerged?
- How are these values communicated inside the company?
- How does the company ensure compliance with these values?
- Why has sustainability potentially been included in the strategy or is it even the core of the strategy?

Do you know any differences in sustainability at the strategic level between Finland and the China subsidiary?

- Are people, in general, in the company familiar and convinced with the strategy?

4. Sustainability at the operational level in the company

- To what extent is sustainability transposed into operational practices and in what areas does this occur?
- How is sustainability at the strategic level transposed into operational practices?
- Why sustainability practices at the operational level?
- What kind of sustainability practices does the company execute in its operations?
- To what extent do these operations manifest sustainability?

5. Sustainability in sustainability or in accounting systems (questions to an accounting person)

- What kind of sustainability systems the company have?
- How is sustainability reflected in sustainability systems? What kind of sustainability/accounting practices are there?
- How have these sustainability practices emerged? What kind of factors influenced their development?
- How are these sustainability-based accounting tools used inside the organization? How does accounting support sustainability operations?

- Are there differences between (sustainability-related) accounting practices in the Finnish company and Chinese subsidiary? What kind of?

6. Sustainability in communication/reporting

- How is sustainability communicated outside the company and to whom?
- Why is sustainability reporting done?
- Who/what departments are producing the reporting?
- Based on which data is the reporting produced?
- How is sustainability reporting linked to accounting practices and accounting department?
- How are the needs of stakeholders figured out?
- How do you know the degree of match between sustainability information supply and demand?
- Are there any differences between reporting of the Finnish company and the Chinese subsidiary?

7. Concluding questions

- What do you think about the future of sustainability in your company?

8. Other topics of interest for the interviewee regarding sustainability?

External influences on sustainability management: standards, laws, peer pressures, industrial guidance etc.

12 References

Allen, A., Lewis-Western, M. F. and Valentine, K. (2022). The innovation and reporting consequences of financial regulation for young life-cycle firms, *Journal of Accounting Research* 60(1), 45–95.

Cooper, S. M. and Owen, D. L. (2007). Corporate social reporting and stakeholder accountability: the missing link, *Accounting, Organizations and Society* 32(7–8), 649–667.

Deegan, C. and Unerman, J. (2006). *Financial Accounting Theory, European Edition*, Berkshire: McGraw-Hill.

Farooq, M. B. and de Villiers, C. (2019). Understanding how managers institutionalise sustainability reporting: evidence from Australia and New Zealand, *Accounting, Auditing and Accountability Journal* 32(5), 1240–1269.

Gunarathne, N., Lee, K.-H. and Kaluarachchilage, P. K. H. (2022). Tackling the integration challenge between environmental strategy and environmental management accounting, *Accounting, Auditing and Accountability Journal*. doi: 10.1108/AAAJ-03-2020-4452.

Hofman, P. S., Moon, J. and Wu, B. (2017). Corporate social responsibility under authoritarian capitalism: dynamics and prospects of state-led and society-driven CSR, *Business and Society* 56(5), 651–671.

Huppertz, T. and Vasiljevic, T. (Eds) (2022). *Understanding and Improving the Functional and Nutritional Properties of Milk*, Cambridge: Burleigh Dodds Science Publishing.

Kautto, M. (Eds) (2001). *Nordic Welfare States in the European Context*, Florence, KY: Routledge.

Kok, A., Oostvogels, V. J., de Olde, E. M. and Ripoll-Bosch, R. (2020). Balancing biodiversity and agriculture: conservation scenarios for the Dutch dairy sector, *Agriculture, Ecosystems and Environment* 302, 1–10.

Marquis, C., Zhang, J. and Zhou, Y. (2011). Regulatory uncertainty and corporate responses to environmental protection in China, *California Management Review* 54(1), 39–63.

McLaren, J. and Appleyard, T. (2020). Improving accountability for farm animal welfare: the performative role of a benchmark device, *Accounting, Auditing and Accountability Journal* 33(1), 32–58.

Röös, E., Patel, M. and Spångberg, J. (2016). Producing oat drink or cow's milk on a Swedish farm – Environmental impacts considering the service of grazing, the opportunity cost of land and the demand for beef and protein, *Agricultural Systems* 142, 23–32.

Sachs, J., Kroll, C., Lafortune, G., Fuller, G. and Woelm, F. (2021). *The Decade of Action for the Sustainable Development Goals: Sustainable Development Report 2021*. Cambridge University Press. doi: 10.1017/9781009106559.

Senn, J. and Giordano-Spring, S. (2020). The limits of environmental accounting disclosure: enforcement of regulations, standards and interpretative strategies, *Accounting, Auditing and Accountability Journal* 33(6), 1367–1393.

Sizemore, G. C. (2015). Accounting for biodiversity in the dairy industry, *Journal of Environmental Management* 155, 145–153.

Sun, Y. and Lange, Y. (2023). Implementing biodiversity reporting: insights from the case of the largest dairy company in China, *Sustainability Accounting, Management and Policy Journal* 14(1), 75–100.

Sustainability Accounting Standards Board (2018). *Meet, Poultry and Dairy Sustainability Accounting Standards*, San Francisco, CA: The SASB Foundation.

Thomson, I. (2014). Mapping the terrain of sustainability and accounting for sustainability. In: Bebbington, J., Unerman, J. and O'Dwyer, B. (Eds) *Sustainability Accounting and Accountability* (2nd edn., pp. 15–29), London: Routledge.

Tran-Nguyen, E., Halttula, S., Vormisto, J., Aho, L., Solitander, N., Rautio, S. and Villa, S. (2021). *Status of Human Rights Performance of Finnish Companies (SIHTI) Project: Report on the Status of Human Rights Performance in Finnish Companies.* Publications of the Ministry of Economic Affairs and Employment 2021:17.

Yang, H. H., Craig, R. and Farley, A. (2015). A review of Chinese and English language studies on corporate environmental reporting in China, *Critical Perspectives on Accounting* 28(May), 30–48.

Zhang, R., Han, Z., Lu, Q., Wang, K., Chen, Y., Cong, W.-F. and Zhang, F. (2022). Harnessing biodiversity for healthy dairy farms, *Frontiers of Agricultural Science and Engineering* 9(2), 238–244.