Setting a circular economic model for food actors in the selected Baltic areas

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Abstract

Several regional municipalities in the Baltic region have prioritised food and sustainability in their long-term strategies. However, limited local experience and resources are challenging in furthering circular food systems and food waste management. This is also evident in Tartu, Latgale, and Vilnius areas, where cross-sector cooperation has been slow. This study aimed to support the green transition toward circularity in these areas. A questionnaire was conducted to support the framework development. The stakeholder input from the questionnaire confirmed and verified the framework. Stakeholders largely agreed with the framework, though some disagreement appeared, especially in the restaurant sector. Time and resources are needed in advancing circular food systems in the region.

Keywords: framework, stakeholders, end-users, waste management, green transition, sustainable procurement

Tiivistelmä

Useat Baltian alueen kunnat ovat asettaneet ruoan ja kestävyyden etusijalle pitkän aikavälin strategioissaan. Kuitenkin vähäinen kokemus ja resurssien puute on haastavaa kiertotalousjärjestelmien ja ruokahävikin hallinnassa. Tämä on havaittavissa myös Tarton, Latgalen ja Vilnan alueilla, joissa poikkisektorinen yhteistyö on edennyt hitaasti. Tämän tutkimuksen tavoitteena oli tukea vihreää siirtymää kohti kiertotaloutta näillä alueilla. Tutkimuksessa toteutettiin kysely, joka tuki viitekehyksen kehittämistyötä. Sidosryhmille suunnatun kyselyn avulla vahvistettiin viitekehyksen soveltuvuus. Sidosryhmät olivat pitkälti samaa mieltä viitekehyksestä, vaikka erimielisyyksiä esiintyi jonkin verran, erityisesti ravintola-alalla. Alueen kiertotalousjärjestelmien edistämiseen tarvitaan aikaa ja resursseja.

Avainsanat: sidosryhmät, loppukäyttäjät, jätehuolto, kiertotalous, kestävä kehitys

1 Introduction

The circular economy (CE) represents a framework for production and consumption processes, where the materials are recycled for as long as possible (European Parliament (EP), 2023). When the products' lifecycles end, the materials are reused in the economy whenever possible and can be refined into valuable resources. The objective is to minimize waste as much as possible. This approach differs from the linear and traditional economic model, which is based on the buy-make-consume-dispose concept. The transition to CE can reduce environmental impacts and promote the availability of raw materials (EP, 2016a, p. 1). Additionally, the CE supports economic growth, employment, competitiveness, and innovation. The European Union aims to create a circular and climate-neutral economy by 2050 (EP, 2023). This project seeks to study and identify the opportunities and obstacles related to the green transition and the CE (Kannan et al., 2022, p. 2–10) in the Baltic countries.

This article builds upon a previous study that examined the current state of the local food system in the Baltic countries from a CE perspective. The earlier study identified both good practices and challenges faced by various actors in the local food chain in the Baltic countries. These actors included small-scale farmers, food producers, entrepreneurs, restaurants, and municipal food services. The first article entitled "Local and circular food system in selected Baltic areas" provides detailed information on the interview process and the online ethnographic findings. In this publication, the focus is on the development and testing of a framework entitled "Setting the Table for a Circular FoodShift". The literature review in this article focuses on existing best practices among various actors in the food system from agricultural and food producers to end users in the restaurant and public sectors (Feenstra, 1997, p. 29–31). These reviewed themes are the same as in the theoretical framework study.

The framework brings together existing good practices and identified challenges. The framework aims at finding solutions to these challenges. To further develop the framework, a questionnaire has been sent to

stakeholders. This outcome is published in this article and on the project website. The collected data was used in developing the framework based on ideas proposed. This enables the creation of a systematic model and supports planning the development and action implementation. According to Jozkowski's (2017, p. 378) summary a conceptual framework is functioning both as a product and a process. The framework can guide in developing the research. It also supports various food actors in moving towards a more responsible, resource-efficient food production.

The framework model "Setting the Table for a Circular FoodShift" focuses on redefining the role of various organisations within the current food system. It focuses on the responsibility of the procurement system within a short, local food system (LFS). In the of the European Parliament and of the Council 24/2014 the public procurement is defined. The framework describes the current level of cooperation and communication among actors in the LFS. It also outlines how sustainability and CE principles are reflected in the LFS. The challenges addressed are based on the current situation of the actors, which can hinder progress toward green transition and circularity. To overcome these challenges, the framework proposes practical measures that support systemic development. Actors in the food system are analysed separately using the same criteria. The only exception is the group of small farmers, in which organic farmers are treated as a distinct group due to their specific characteristics.

2 Literature Review

2.1 Sustainable Procurement in Food Transition

Short Food Supply Chains (SFSC) give producers the opportunity to sell their products directly to the end-user, thus receiving higher final selling price (EP, 2016b, p. 5). SFSC is an important source of income for producers, allowing them to improve and develop their farms. Buyers also benefit from SFSC, as they receive seasonal and fresh products that are easily traceable. SFSC connects producers and buyers, creating a better relationship of trust between these groups. Additionally, LFSs promote collaboration and create jobs in the food production chain. In local food chains, products are often produced sustainably, e.g., using fewer chemicals. Since local food is seasonal and fresh, it can be stored and packaged in smaller spaces, saving energy. Furthermore, short transportation distances help in minimizing environmental impacts (Wakeland et al., 2012, pp. 224–226).

The restaurant owners' opinion is that adopting CE principles requires systematic changes (Renfors & Wendt, 2024, p. 6). A menu based on LFS raw materials, which are provided by local, small producers, who share the same values and are committed to common environmental goals, is one step in a CE system. Ingredients are collected daily to maintain freshness. The supply chain includes only few, if any, intermediaries, and the operational model is based on a farm-to-table or farm-to-fork strategy. Restaurant owners mention that implementing a supply of ingredients according to the model is challenging. This approach also requires close cooperation with producers, which helps to minimize packaging waste, when the products are transported in reusable containers. The packages must be compostable, when products are sold unpacked (Raźniewska, 2022, p. 3748).

2.2 Food Waste

The in force version of the Waste Framework Directive establishes waste, recycling, and resource recovery in the basic concepts for the waste management (Directive of the European Parliament and of the Council 98/2008; European Commission (EC), n.d.-b). This directive requires that waste is managed in a way that does not harm the environment. Furthermore, it must not endanger human health. In this document it is clarified at which point waste is no longer classified as waste, i.e., when it becomes a secondary raw material. It also clarifies how waste is distinguished from by-products. A five-step waste hierarchy is the foundation of EU's waste management. It defines the order of the waste treatment process. The goal of the waste policy of EU is to utilize waste as high-quality natural resources and promote the CE (EC, n.d.-c). The Waste Directive requires the EU member states to reduce food waste across the entire food supply chain, as well as to monitor and record volumes (EC, n.d.-a). Resource efficiency and competitiveness are supported through the European Green Deal program. The member states must develop programs to reduce food waste, promote food donation and redistribution, and encourage the application of the waste management hierarchy.

The goal of the food waste hierarchy in the entire supply chain is primarily to prevent food waste and to use surplus food efficiently (EC, n.d.-a). If food waste occurs, redistributing or donating food for human consumption is considered as a good practice. The second-best option is using food as animal feed, followed by industrial applications where food-derived materials are utilized as raw materials in pharmaceutical and cosmetic industries. When food no longer can be used as it is, it can be repurposed for recycling, nutrient recovery, composting, or biogas production. Energy recovery through combustion of food waste is less favourable than its use as landfill or in combustion without energy recovery due to investment incentives from local government (Sarangi et al., 2024, p. 164). The CE model supports transformation of agricultural waste to valuable by-products as a proper waste management method (Haque et al, 2023, p. 137873). Minimizing the use of external resources, creating a closed-loop nutrient cycle, and reducing the environmental impacts of waste are key principles of circular agriculture. Harvest residues and animal waste are examples of biomass waste that can be processed into nutrient-rich fertilizers containing phosphorus, potassium, and nitrogen (Sarangi et al., 2024, p. 164).

As summarized by Cardenas et al. (2024, p. 2), the use of the food waste hierarchy provides a structured framework to reduce waste and promote sustainable practices systematically in hospitality businesses. Effective practices for food waste prevention include systematic menu planning, just-in-time ordering systems, and reassessment of operational strategies. To minimize food waste, key approaches involve portion control, reduced plate sizes, and avoiding of overproduction as well as activities that make food inedible. Furthermore, maximizing the use of existing ingredients before purchasing new ones is an effective strategy for reducing waste and use of resources. Food waste recycling can be implemented through various methods e.g., reusing, redistributing, or processing the waste for other uses.

In the food service sector, surplus food can be sold at a discounted price or donated to charities (Lehn & Schmidt, 2023; Sundin et al., 2023). This process should be systematically monitored and documented to ensure efficiency and compliance with regulations. Identifying potential partners and exploring appropriate methods for food waste management can provide valuable insights in optimizing operations. Surplus food can also be served the following day or frozen for later use. Sensory evaluation and techniques such as refreshing

vegetables can help recover and extend the usability of food products, thereby contributing to food waste reduction (Cardenas et al., 2024, p. 2).

Efforts to prevent food waste should focus on leveraging effective measures proven in other regions (Pancino et al., 2021, p.1098-1099; Economou et al., 2024, p. 1). Regional initiatives are effective locally; they must rely on both national and European legislation. In awareness campaigns, students play a key role because their eating habits greatly influence the amount of food waste generated. A unified European regulation for monitoring food waste across different stages of the supply chain is important.

2.3 Collaboration

Collaboration among key actors across industry and organizational boundaries would promote the achievement of CE goals (Karppinen et al., 2019, p. 13). Aligning activities and advancing cooperation would best be supported long-term through creating an independent organization. This would promote comprehensive and efficient use of expertise, capabilities, and financial resources.

According to research by Bloise (2019, p. 784), farmers are interested in forming collaborative relationships to help them manage food waste. Farmers benefit from establishing formal networks with different stakeholders in the supply chain. The retailers' support in preventing food waste can be improved through creating a platform that connects the producers with the buyers. These networks enable the sharing of knowledge, best practices, and improved collaboration routines. Benefits of cooperation reduce working hours and costs (Lutz et al., 2017, p. 11).

The restaurants' chefs see local cuisine as a strategic opportunity to grow their business (Pacciarotti & Torregiani, 2018, p. 1731). According to the study of Stoeva et al. (2024, p. 20) collaboration between restaurants and farmers improves the position of restaurants in the food supply chain. Sharing information about prices, products, and deliveries are key factors in an improved cooperation and restaurants gain access to fresh organic products from farmers. Furthermore, shared goals strengthen the effectiveness of the collaboration. Enhanced distribution and communication channels will support farmers in accessing the restaurant market (Pacciarotti & Torregiani, 2018, p. 1731). Due to the stakeholders' engagement and the lack of evident barriers, private managers committed to the fair economy are likely to support the introduction of a local service in logistics.

The growth potential of small restaurant enterprises can increase substantially, thereby enhancing regional development through cooperative efforts. Cooperation between restaurants and suppliers, established in equitable commercial relationships and mutual trust, is fundamental to the financial success of restaurants. The business relations between suppliers and restaurants are based on personal trust and ethical practices (Husted, 1998, p. 246).

Cooperatives can implement innovative, sustainable practices, and long-term product plans by engaging communities in the CE (Savga et al., 2023, p. 18–19). Cooperatives can promote a sustainable economic model that emphasizes resource efficiency and waste reduction. Members of a cooperative can organize training events that share awareness of sustainable practices, which are beneficial to the environment and the local economy. These events can attract customers interested in sustainability (White et al., 2019, p. 3–4).

2.4 Training

Through training, people understand the benefits of the CE, which in turn support the CE (Tiippana-Usvasalo et al., 2023, p. 11). Training equips people with skills, knowledge, attitudes, values, and behaviours, which supports the sustainability of the environment, economy, and society (UNESCO, n.d.) Competence development promotes responsible, informed decision-making for a better future. In the (Degerman et al., 2023, p. 1–2) it was highlighted that the progress of the CE is growing rapidly, thus more education about CE is needed to develop competence at all workplace and educational levels.

In the future, farmers need skills, based on education and training, to work and live in challenging situations protecting the environment (EP, 2017, p. 1). One of ten objectives of the Common Agricultural Policy (CAP) for 2023–2027 is to promote knowledge exchange and training (EC, 2022). The Agricultural Knowledge and Information System (AKIS) is being developed to support demand-driven learning among farmers through targeted advisory services, training, and knowledge repositories. Agriculture is developing rapidly as scientific knowledge evolves (EP, 2017, p. 7) and due to this, farmers are required to have sufficient economic and technical expertise.

The sustainability in primary production can be promoted through nutrient circulation, efficient use of natural resources, and minimizing environmental impacts through crop rotations, creation of habitats, reduction of chemical inputs, biodiversity support and protection of endangered species (Sher et al., 2024, p. 19). From a socio-ecological perspective, such practices can offer improved livelihood of small-scale farmers and opportunities for diversification. This requires collaboration among stakeholders and investments in e.g., infrastructure, education, and research (Mamo, 2023, p. 217–218).

By training employees in the hotel, restaurant and catering (HoReCa) sector, the overall performance of the organization can be improved (Mbise & Ishika, 2023, p. 83). This is reflected in strengthened brand image, increased market share, higher customer and shareholder satisfaction, as well as financial growth. The training also promotes the adoption of environmental management practices, which supports sustainability in the business. Restaurants must raise awareness about food waste among both employees and customers (Renfors, 2024, p. 19). Increasing awareness and providing education about food waste is an effective way to promote better management of the waste generated in operations. Skilled restaurant staff can reduce food waste, which is not only sustainable but also economically beneficial (Montesdeoca-Calderón & Filimonau, 2024, p. 7). Training also supports broader resource conservation and understanding of social responsibility. Additionally, training can influence consumers' perceptions of sustainability and promote the shift of gastronomy towards more responsibility (Renfors, 2024, p. 15–17).

3 Methodology

This article is a continuation of the first article entitled "Local and circular food system in selected Baltic areas". The first article focused on analysing the current situation in Baltic countries whereas this article focuses on developing and testing the Circular FoodShift Framework for selected Baltic areas. The overall process of the development process is visualised in Figure 1. This article focuses on Step 3 of the overall

process.

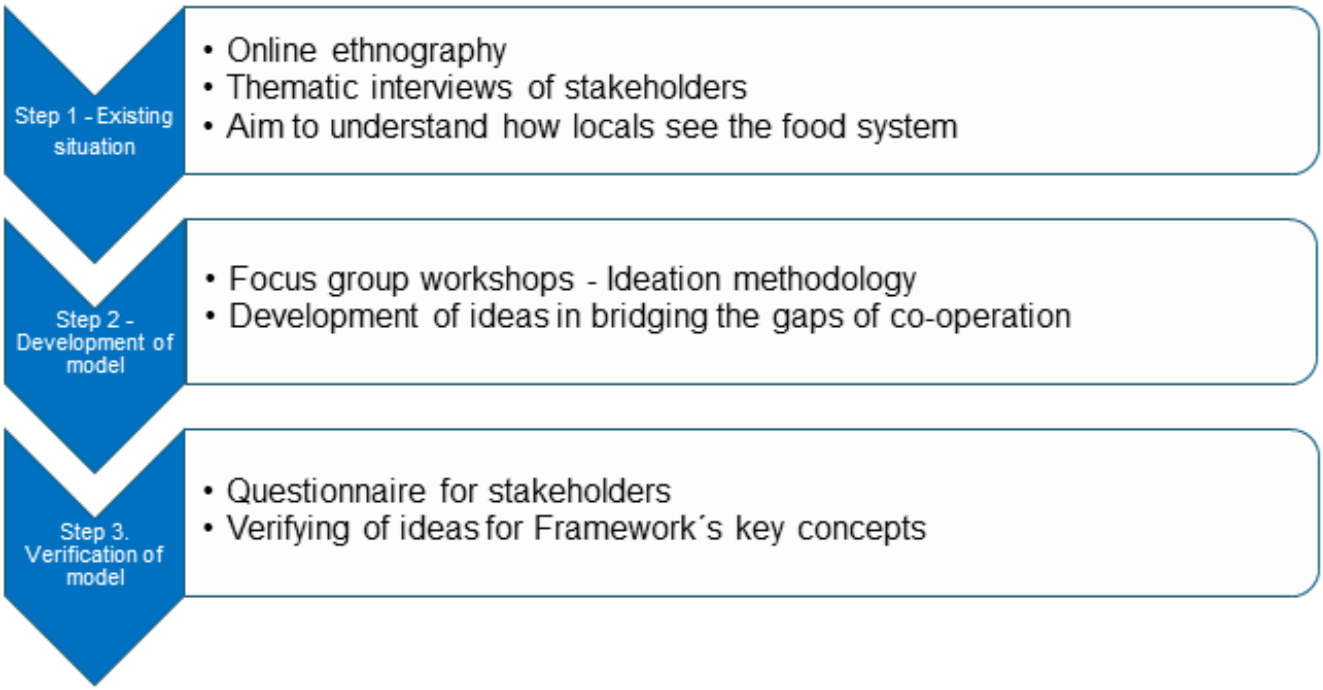


Figure 1. Steps in creating a circular economy (CE) model “Setting the Table for a Circular FoodShift” for actors in the selected Baltic areas (Latomäki, 2025).

The results of the first article were used to create the Circular FoodShift Model. A questionnaire was used to verify the ideas presented in the framework (Table 1). The research questions of the questionnaire were designed to ask whether local stakeholders agree with the key concepts of the framework and which of the key concepts they found most suitable for enhancing circular transition locally.

The aim of the questionnaire was to verify that the Circular FoodShift model had captured the essential concepts for developing the local linear economy shifting to CE. The questionnaire and questions are introduced in Table 1. At first, respondents were asked to identify their organisation and country as well as their role in the food system. Thereafter, it was asked how accurate the following statements were to the respondents. They were asked to use the scale 1-5 (1=inaccurate – 5=completely accurate). The questionnaire was structured into three separate sections i.e., own sections for the different stakeholder groups identified in the previous article. All three sections were similarly built on questions about the current situation, identified developmental gaps, and solutions for the development of CE in their countries. Respondents were given information which stakeholder group they need to consider when responding. At the end of the questionnaire there was an open-ended question for observations and comments about the research. The statements, presented in the questions, were based on results in Article 1 (Latomäki et al., 2025c) and from the literature review. The statements for the Circular FoodShift Framework were developed for the Baltic countries through interviews, workshops and a questionnaire (Latomäki et al., 2025a, 2025b, 2025c). The obtained data was reviewed and analysed. Based on the analysis of the obtained results, conclusions were drawn and presented in chapter 4.

The questionnaire was created using Webpropol 3.0. Response to the questionnaire was enabled for 24 days. The questionnaire was distributed to respondents in activities of the first article and to project partners,

who also forwarded it to their stakeholders. All three sections in the survey were similarly built on questions describing current situation, identified developmental gaps, and solutions for the development of CE in their countries. There were 2 Open-Ended, 2 Multiple-Choice and 9 Rating-Scale questions in the three sections in the survey. Each of the Rating-Scale questions contained several sub-questions.

Reminders were posted twice during the data collection period. Based on data the questionnaire link was opened by 97 individuals, of which 34 started to fill the questionnaire. The total number of respondents were 21 (response rate: 21,7%) with 21 respondents in the section “Small food producing entrepreneurs”, 20 respondents in “Sustainable gastro entities”, and 19 respondents in “Public sector food services”. All respondents, who had expertise enough, were able to answer all the questions. The respondents were all experts in the food system and had general knowledge of the situation in their own countries as well as in the Baltic countries. The results in this study can be considered descriptive and qualitative due to response rate and total number of respondents. Since there is a limited number of respondents mean, and standard deviation were not used to describe the data. The authors have instead showed the full distribution of answers in percentages.

Table 1. Structure of the questionnaire. The Rating-Scale questions contained several related statements, which are found in tables 2–4.

Question	Question Type	Question / Info
1	Open-Ended	Name of your organization or business
2	Multiple-Choice Question	I will answer from the perspective of the following country
3	Multiple-Choice Question	Your role in the food system?
	Additional info	**The next three questions aim to define the framework from the perspective of a farmer, food producer or food entrepreneur. You can leave the questions blank if you feel that you are not able to answer.**
4	Rating-Scale Question	In my opinion, the following statements about the current situation of the circular economy* in my country are accurate on a scale 1–5
5	Rating-Scale Question	In my opinion, the following statements about developmental gaps of the circular economy* in my country are accurate on a scale 1–5
6	Rating-Scale Question	In my opinion, the following statements about the solutions for the development of the circular economy* in my country are accurate on a scale 1–5
	Additional info	**The next three questions aim to define the framework from the perspective of hotel, restaurant, and cafe entrepreneurs. You can leave the questions blank if you feel that you are not able to answer.**
7	Rating-Scale Question	In my opinion, the following statements about the current situation of the circular economy* in my country are accurate on a scale 1–5
8	Rating-Scale Question	In my opinion, the following statements about developmental gaps of the circular economy* in my country are accurate on a scale 1–5
9	Rating-Scale Question	In my opinion, the following statements about the solutions for the development of the circular economy* in my country are accurate on a scale 1–5

	Additional info	**The next three questions aim to define the framework from the perspective of the public food sector. You can leave the questions blank if you feel that you are not able to answer.**
10	Rating-Scale Question	In my opinion, the following statements about the current situation of the circular economy* in my country are accurate on a scale 1–5
11	Rating-Scale Question	In my opinion, the following statements about developmental gaps of the circular economy* in my country are accurate on a scale
12	Rating-Scale Question	In my opinion, the following statements about the solutions for the development of the circular economy* in my country are accurate on a scale 1–5
13	**Open-Ended**	**Additional comments and observations about the research are welcomed**
* CE		

4 Results and discussion

4.1 The questionnaire

A total of 21 questionnaire responses were received. The respondents represented Latvia (38%), Estonia (24%), Lithuania (19%), and other countries (19%). The foreign respondents were experts from foreign countries, who have been working in development projects in the area. The respondents were asked to evaluate statements about the food system in the Baltic countries. The statements reflected the respondents' own opinions. Depending on the knowledge of the respondents answers to all questions were not required. Most respondents answered all questions.

Of the respondents, 10% represented food producers or professionals from the HoReCa sector, 19% non-governmental organizations (NGOs) i.e., community organizations, and 24% educational institutions. In addition, 10% were from municipal public authorities and 5% from national public authorities. The remaining 24% represented other types of organizations. The results of the questionnaire are presented in three sections: small food producing entrepreneurs (Table 2), sustainable gastro entities (Table 3), and public sector food services (Table 4). Each table includes the statements and respondents' evaluation. The respondents in the above-mentioned sections were: 21, 20 and 19, respectively.

4.2 Small food producing entrepreneurs

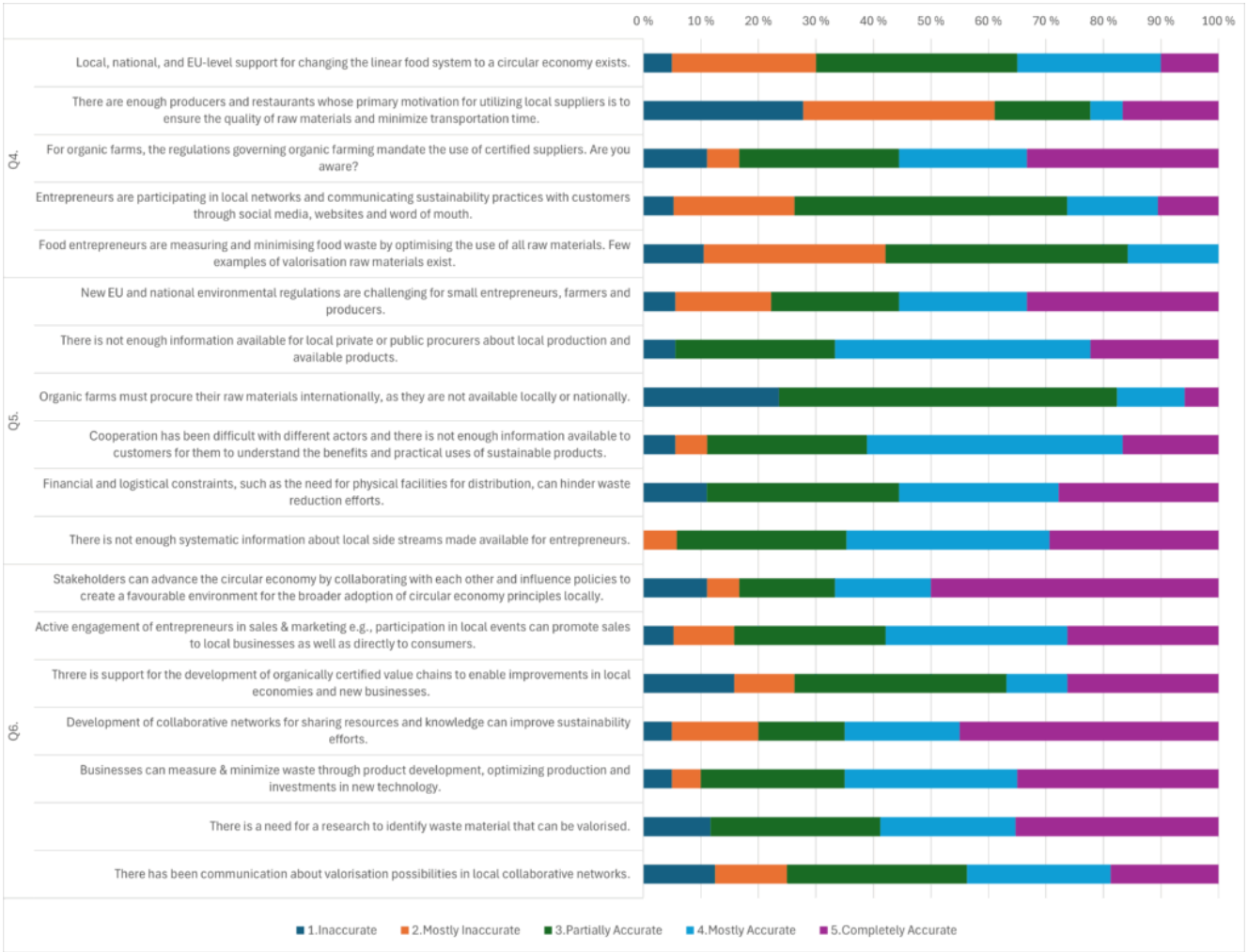
It was concluded that the knowledge exchange and advisory activities of CAP is still relevant as it provides clear value and is significant for farmers in the transition towards sustainable agriculture (EC, 2022). In Table 2, the results on statements about the current situation (Q4), developmental gaps (Q5) and potential solutions of the CE (Q6) are presented on a scale from 1–5 (1 = inaccurate – 5 = completely accurate) as accurate from farmers', food producers' and food entrepreneurs' perspective in their countries.

The responses on the current CE situation in the Baltic countries are given in Table 2, section Q4. Most respondents (35%) found the statement partially accurate regarding the existence of "support at the local, national, and EU levels for transitioning the linear food system to a circular economy." Additionally, 25%

considered it mostly inaccurate, while another 25% found it mostly accurate. 33% of the respondents considered it mostly inaccurate that “there are sufficient producers and restaurants whose primary motivation for using local suppliers is to ensure the quality of raw materials and minimize transportation time.”

Regarding the statement (Table 2, Q4), “For organic farms, the regulations governing organic farming mandate the use of certified suppliers. Are you aware?” 39% of the responses given were found completely accurate and 37% mostly accurate. More than half of the respondents (60%) found the statement “entrepreneurs engage in local networks and communicate sustainability practices to customers via social media, websites, and word of mouth” partially accurate. The statement “food entrepreneurs are measuring and minimising food waste by optimising the use of all raw materials, although only a few examples of raw material valorisation exist,” evoked mixed responses. Approximately 45% of respondents answered that the statement was partially accurate, while 35% considered it mostly inaccurate.

Table 2. Results about the current situation (Q4), the developmental gaps (Q5) and the potential solutions of the CE situation (Q6) in Baltic countries from the perspective of farmers, food producers or food entrepreneurs (see questions in Table 1).



The responses on gaps given in section Q5 (Table 2) the results of the respondents showed that the statement “New EU and national environmental regulations are challenging for small entrepreneurs, farmers and producers” was considered completely accurate (33%) or mostly accurate (29%). Most respondents found the statement “there is not enough information available for local private or public procurers about local

production and available products" partially accurate (37%) or mostly accurate (37%). Only 5% found the statement inaccurate. The statement that organic farms must procure their raw materials internationally, as they are not available locally or nationally was considered mostly accurate by 63% of the respondents. The statement dealing with cooperation difficulties with different actors and available information to customers so that the customers can understand the benefits and practical use of sustainable products was kept mostly accurate by 40% of the respondents and only 5% found it inaccurate. The question about financial and logistical constraints can hinder waste reduction efforts was by the respondents found mostly accurate (37%) or partially accurate (37%). Only 5% of the respondents disagreed with the statement. The respondents agreed with the statement that there is not enough systematic information made available for entrepreneurs about local side streams. Only 5% of the respondents disagreed with the statement.

Section Q6 (Table 2) focused on potential solutions for developing CE in Baltic countries. Most of the respondents (85%) found the development statement accurate to some extent. The distribution in the answers was 40% completely accurate, 25% mostly accurate, and 20% partially accurate. The original statement was "stakeholders can promote the circular economy by collaborating and influencing policies to create a supportive environment for the broader adoption of circular economy principles at the local level". Almost all respondents (95%) supported the idea that "active engagement of entrepreneurs in sales & marketing etc., participation in local events can promote sales to local businesses as well as directly to consumers." Only 5% of respondents considered this statement to be mostly inaccurate. The statement on support for the development of organically certified value chains to enable improvements in local economies and new businesses was found to be partially accurate by 45% of the respondents. Also 25% of respondents found the statement mostly accurate and 15% completely accurate.

Almost all respondents (90%) found the development solution statement (Table 2) "The development of collaborative networks for sharing resources and knowledge can enhance sustainability efforts" accurate to some extent. Most of them found it completely accurate 43%. As many as 48% of respondents found it completely accurate that solution business can measure and minimize waste through product development, optimizing production, and investing in new technology. Only 5% of respondents considered the statement mostly inaccurate. The result from the questionnaire responses showed that the statement "There is a need for research to identify waste materials that can be valorised" was generally seen as accurate to some extent. The opinions were divided as follows: partially accurate 37%, mostly accurate 37% and completely accurate 26%. The respondents rated the statement 'There has been communication about valorisation possibilities in local collaborative networks' as mostly accurate. The opinions were divided as follows: inaccurate 11%, mostly inaccurate 11%, partially accurate 50%, mostly accurate 17% and completely accurate 11%.

4.3 Sustainable gastro entities

In Table 3, the results on the following statements about the current situation (Q7), developmental gaps (Q8) and potential solutions of the CE (Q9) in my country are accurate from the perspective of hotel, restaurant, and cafe entrepreneurs on a scale from 1-5 (1 = inaccurate – 5 = completely accurate) are presented.

In section Q7 (Table 3) about the current situation of CE, there were mixed responses to the statement: "Hotels, restaurants, and cafes bring people together and educate them on sustainable and local ingredients."

A total of 55% of respondents found the statement inaccurate, while 30% thought it was partially accurate and 15% mostly accurate. The respondents found the statement: “There are many restaurants and cafes that have developed menus based on local ingredients.” partially accurate (45%). However, 30% of respondents thought the statement was mostly inaccurate. The results show that the answers were mixed regarding the statement: “Restaurants and cafes cooperate actively with local suppliers and communicate directly on social media about sustainability or certifications.” Most respondents (56%) thought this was mostly inaccurate. The accurate opinions were divided as follows: partially accurate 33%, mostly accurate 5% and completely accurate 6%. Similar responses to the statement “Organisations are minimizing food waste. The goal is to create zero waste” was obtained. Approximately half of the respondents considered the statement inaccurate, and the other half found it accurate to some degree (30% partially accurate and 20% mostly accurate).

In section Q8 (Table 3) about development gaps, many of the respondents found the statement “Information is available for customers onsite as part of the service, but information relevant to procuring local raw materials is not available for producers” in some form accurate The percentage shares of the responses were: inaccurate (0%), mostly inaccurate (31%), partially accurate (37%), mostly accurate (32%) and completely accurate (0%). The accurate responses on the developmental gap that sustainable products are more expensive for restaurants of the respondents were: partially accurate (10%), mostly accurate (40%) and completely accurate (45%). Only 5% of respondents found the statement mostly inaccurate. Responses regarding the statement, “Volume and reach of communication are not capturing wider audiences,” were found accurate in some extent (90%): partially accurate (25%), mostly accurate (55%) and completely accurate (10%). Most respondents found the statement that there is a lack of clear and understandable information about how to minimise waste and accurate knowledge of the local waste management system.

In section Q9 (Table 3), about the possible solutions to develop CE, the results of the statement “Communication with different stakeholders can be improved. For customers, more information can be provided on companies’ website or in social media. Information of procurement needs for local producers can be shared on companies’ website or in collaborative networks” was found completely accurate by 50% of the respondents. Additionally, 35% considered the statement mostly accurate, and 15% found it partially accurate, which means that none of the respondents found the statement inaccurate.

Table 3. Results to statements about the current situation (Q7), the developmental gaps (Q8) and the potential solutions of the CE (Q9) situation in Baltic countries from the perspective of hotel, restaurant, and cafe entrepreneurs (see questions in Table 1).

About the results on how to improve communication with different stakeholders, more information can be provided on companies' websites or on social media. Information on procurement needs for local producers can be shared on companies' websites or in collaborative networks." Many respondents (42 %) found the development statement that information on optimised portion sizes and mise-en-place is available, and that alternative cooking methods are adopted to limit the price of ingredients partially accurate. Additionally, 26% kept the statement mostly accurate and 5% completely accurate.

The result in Table 3 about the statement "Sharing information with customers about the use of local ingredients and collaboration with small producers who share the same values and are committed to common environmental goals can be used to justify a higher price" was similarly found accurate to some extent. Most of them (40%) considered it mostly accurate. The result regarding the potential solution to the statement "Tourism marketing efforts have been adopted by local governments for the benefit of hotels, restaurants, and cafés which have adopted sustainable practices and/or local ingredients" was found mostly inaccurate (37%). However, the majority still considered the statement accurate to some extent: partially accurate (32%), mostly accurate (26%) and completely accurate (5%). Responses to the statement "There is a need for increasing the volume of marketing activities related to sustainability on social media and the organisation's website" as mostly accurate (50%) and completely accurate (35%). Responses regarding the development statement "Organisations are preventing waste through systematic menu planning, just-in- time ordering systems, and the reassessment of operational strategies" was kept partially accurate (55%), mostly accurate (15%) and completely accurate (15%). The response showed also results on inaccuracy: inaccurate (0%) and mostly inaccurate (15%). All respondents to the statement "Separating organic waste and analysing waste sources can help organisations to further develop their waste management" kept it accurate to some extent. The statement was completely accurate according to 40 % of the respondents and another 40 % kept it mostly

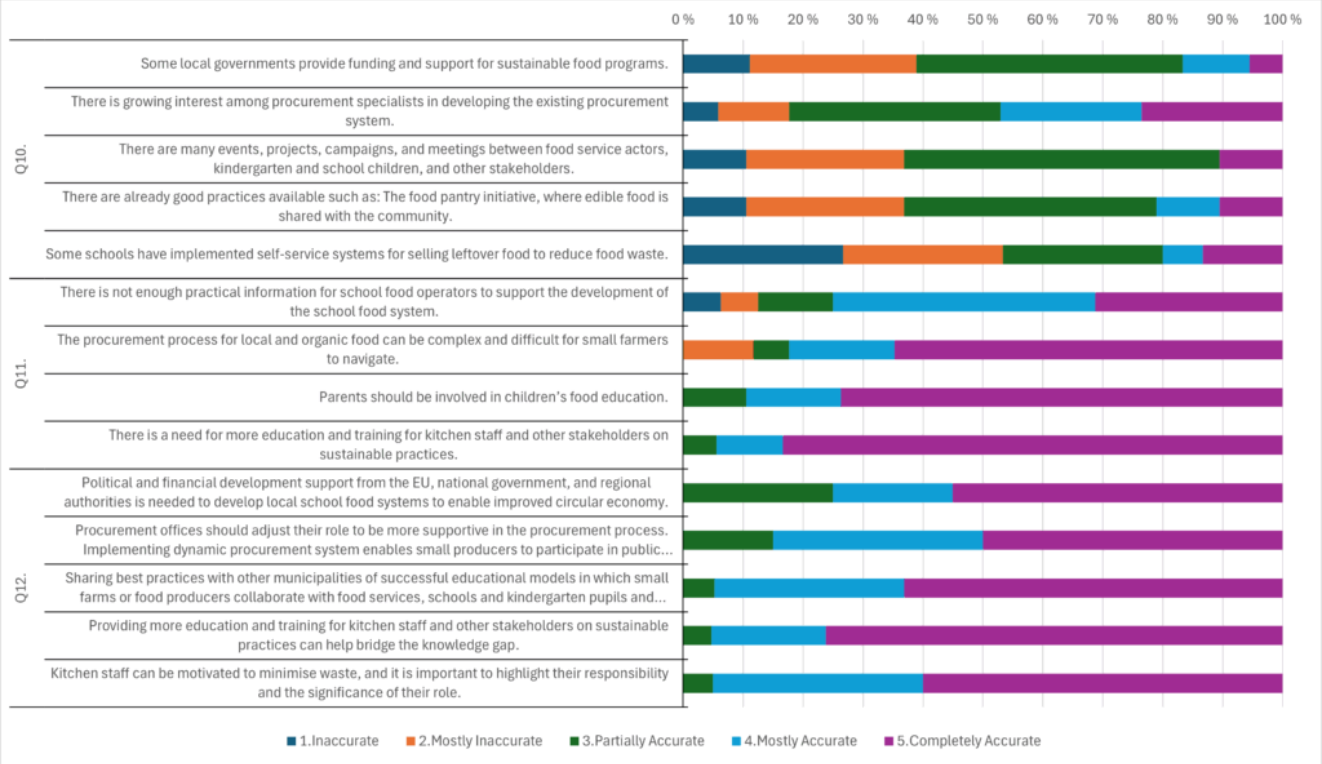
accurate.

4.4 Public sector food services

The role of schools is important in sharing information to pupils about sustainable food treatment e.g., in minimising leavings and food waste (EC, 2023). The results given in Table 4 on the following statements about the current situation (Q10), developmental gaps (Q11) and potential solutions of the CE (Q12) in my country from the perspective of the public food sector representatives are accurate on a scale from 1–5 (1 = inaccurate – 5 = completely accurate).

In section Q10 (Table 4), about the current situation in public food services, most kept the response to the statement “Some local governments provide funding and support for sustainable food programs” partially accurate (44%). Almost all responses obtained to the statement “There is growing interest among procurement specialists in developing the existing procurement system” showed that it was accurate to some extent by most respondents (82%). Many of them found the statement partially accurate (35%). Most of the respondents (53%) found that the statement: “There are many events, projects, campaigns, and meetings between food service actors, kindergarten and school children, and other stakeholders” partially accurate. 42 % of the respondents held the statement “There are already good practices available, such as the food pantry initiative, where edible food is shared with the community” partially accurate. Responses to the statement: “Some schools have implemented self-service systems for selling leftover food to reduce food waste” were mixed. More than half (54%) of the respondents found the statement inaccurate to some extent. The rest (46%) found the statement accurate to some extent.

Table 4. Results to statements about the current situation (Q10), the developmental gaps (Q11) and the potential solutions of the CE (Q12) situation in Baltic countries from the perspective of the public food sector (see questions in Table 1).



In section Q11 (Table 4), about the possible development gaps one third (31%) of the respondents found the statement “There is not enough practical information for school food operators to support the development of the school food system” completely accurate, and 44% of the respondents mostly accurate. Most respondents found the statement “The procurement process for local and organic food can be complex and difficult for small farmers to navigate” accurate to some extent. The opinion of these respondents was completely accurate (65%). Responses were generally in agreement with the statement “Parents should be involved in children’s food education”. Most respondents (74%) found it completely accurate. Results regarding the developmental gap “There is a need for more education and training for kitchen staff and other stakeholders on sustainable practices” all respondents found the statement accurate. The accuracy was divided as follows: completely (83%), mostly (11%) or partially (6%).

In section Q12 (Table 4), about the possible solutions for CE development, the results showed that all respondents found the potential solution to the statement “Political and financial development support from the EU, national government, and regional authorities is needed to develop local school food systems to enable improved circular economy” accurate to some extent. The statement “Procurement offices should adjust their role to be more supportive in the procurement process. Implementing a dynamic procurement system enables small producers to participate in public procurement” was also considered accurate to some extent by all respondents. All respondents found the statement “Sharing best practices with other municipalities of successful educational models in which small farms or food producers collaborate with food services, schools, kindergarten pupils, and parents is important” accurate to some extent. All respondents also held that the statement “Providing more education and training for kitchen staff and other stakeholders on sustainable practices can help bridge the knowledge gap” accurate. All respondents acknowledged that kitchen staff can be motivated to minimise waste. They emphasized the importance of highlighting their responsibility and the significance of their role.

Despite efforts to communicate sustainability to customers, there is often limited awareness or comprehension etc., sustainability certifications represent as well as underlining the importance of making their meaning explicit. Customers are generally not food industry professionals, so many certifications or sustainability actions are not self-evident to them. It is also important that other restaurants can take inspiration from those operating sustainability. This highlights the need to enhance communication regarding sustainability within the restaurant sector, enabling customers and other stakeholders to identify and comprehend the measures undertaken. Making sustainability visible can also enhance its impact and encourage other actors to get involved. As Stoeva et al. (2024, p. 20) stated information sharing is one of the key factors in improving cooperation.

Good practices of food system actors can also be expanded to other areas. It was identified that development ideas can be applied in different operational environments. However, expansion requires consideration of the specific characteristics of the operational environment to ensure that the practices are truly effective and appropriate. By adapting these practices, the implementation of sustainability and the circular economy across the food system can be reinforced, while also supporting collaboration among various actors. Objectives such as effective communication, enhanced cooperation, and the reduction of food waste are applicable and promotable across diverse operational contexts (Becque et al., 2016, pp. 14–15; Motiva, 2024, p. 12).

5 Conclusion

In relation to the framework, the main idea of the framework was to identify the current state, faced challenges, and potential solutions. The framework can have a visible impact on the ability of actors in the food system to towards greener transition and thus greener production. The questionnaire results from the respondents were generally in agreement with most of the issues identified in the framework. Especially regarding school catering, the respondents agreed. Actors can take the framework as a model when developing their operations purposefully towards greater sustainability. Developing operations towards greater sustainability is a long-term effort. The framework provides specific examples how to proceed.

The questionnaire results showed general agreement among respondents regarding the activities in the framework. However, in the case of private restaurants, the respondents partly disagreed. They were not aware that the restaurants had taken sustainable actions promoting the circular economy. The respondents mostly disagreed about the current situation, and the sustainability efforts of restaurants had not been acknowledged outside the customer perspective.

The interviewed restaurants were generally pioneers in responsibility, which may explain the situation. Although they have taken responsible and climate-friendly actions, these may not necessarily have been communicated to anyone other than the restaurants’ customers. Other potential stakeholders may not be aware of what the restaurant has done if the responsible actions occur only within the restaurant during service to customers.

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